





THE BIRDS OF AUSTRALIA.

THE
BIRDS
OF
AUSTRALIA

BY
GREGORY M. MATHEWS
F.R.S.E.

MEMBER OF THE AUSTRALIAN ORNITHOLOGISTS' UNION
AND THE BRITISH ORNITHOLOGISTS' UNION
CORRESPONDING FELLOW OF THE AMERICAN ORNITHOLOGISTS' UNION

WITH HAND-COLOURED PLATES

VOLUME VII.

WITHERBY & CO.
326 HIGH HOLBORN LONDON
1918—1919



2 GL
693
M42
1910
V.7
C.2
SCHMIDT

CONTENTS
AND
LIST OF PLATES.

	PAGE
Order PODARGIFORMES	1
Genus PODARGUS	4
No. 378. TAWNY FROGMOUTH, <i>Podargus strigoides</i>	5
Plates 325-326 lettered <i>Podargus strigoides</i> , to face	5
Genus MICROPODARGUS	38
No. 379. MARBLED FROGMOUTH, <i>Micropodargus ocellatus</i>	39
Plate 327 lettered <i>Micropodargus marmoratus</i> , to face	39
No. 380. PLUMED FROGMOUTH, <i>Micropodargus plumiferus</i>	42
Plate 328 lettered <i>Cyphorina plumifera</i> , to face	42
Genus MEGAPODARGUS	45
No. 381. LARGE FROGMOUTH, <i>Megapodargus papuensis</i>	46
Plate 329 lettered <i>Megapodargus papuensis</i> , to face	46
Genus ÆGOTHELES	51
No. 382. OWLET NIGHTJAR, <i>Ægotheles cristata</i>	53
Plate 330 lettered <i>Ægotheles cristata</i> , to face	53
Genus EURYSTOMUS	69
No. 383. ROLLER, or DOLLAR BIRD, <i>Eurystomus orientalis</i>	70
Plate 331 lettered <i>Eurystomus pacificus</i> , to face	70

THE BIRDS OF AUSTRALIA.

	PAGE
Order ALCEDINIFORMES	79
Genus ALCYONE	82
No. 384. BLUE KINGFISHER, <i>Alcyone azurea</i>	84
Plate 332 lettered <i>Alcyone alisteri</i> , to face	84
Genus MICRALCYONE	95
No. 385. LITTLE KINGFISHER, <i>Micralcyone pusilla</i>	100
Plate 333 lettered <i>Micralcyone halli</i> , to face	100
Genus SYMA	105
No. 386. YELLOW-BILLED KINGFISHER, <i>Syma torotoro</i>	107
Plate 334 lettered <i>Syma flavirostris</i> , to face	107
Genus DACELO	115
No. 387. BROWN KINGFISHER (LAUGHING JACKASS), <i>Dacelo gigas</i>	118
Plate 335 lettered <i>Dacelo gigas</i> , to face	118
No. 388. BLUE-WINGED KINGFISHER, <i>Dacelo leachii</i>	131
Plate 336 lettered <i>Dacelo leachii</i> , to face	131
Genus LAZULENA	141
No. 389. FOREST KINGFISHER, <i>Lazulena macleayii</i>	163
Plate 337 lettered <i>Cyanalcyon macleayii</i> , to face	163
Genus CYANALCYON	172
No. 390. RED-BACKED KINGFISHER, <i>Cyanalcyon pyrrhopygius</i>	173
Plate 338 lettered <i>Cyanalcyon pyrrhopygius</i> , to face	173
Genus SAUROPATIS	179
No. 391. SACRED KINGFISHER, <i>Sauropatis sancta</i>	180
Plate 339 lettered <i>Sauropatis sancta</i> , to face	180
No. 392. MANGROVE KINGFISHER, <i>Sauropatis sordida</i>	193
Plate 340 lettered <i>Sauropatis sordida</i> , to face	193
Genus URALCYON	197
No. 393. WHITE-TAILED KINGFISHER, <i>Uralcyon sylvia</i>	200
Plate 341 lettered <i>Uralcyon sylvia</i> , to face	200

CONTENTS.

	PAGE
Genus COSMAEROPS	205
No. 394. BEE-EATER, <i>Cosmaerops ornatus</i>	208
Plate 342 lettered <i>Cosmaerops ornatus</i> , to face	208
Genus EUROSTOPODUS	219
No. 395. WHITE-THROATED NIGHTJAR, <i>Eurostopodus mystacalis</i>	221
Plate 343 lettered <i>Eurostopodus mystacalis</i> , to face	221
No. 396. SPOTTED NIGHTJAR, <i>Eurostopodus guttatus</i>	227
Plate 344 lettered <i>Eurostopodus argus</i> , to face	227
Genus ROSSORNIS	234
No. 397. LARGE-TAILED NIGHTJAR, <i>Rossornis macrurus</i>	236
Plate 345 lettered <i>Caprimulgus macrurus</i> , to face	236
Genus ZOONAVA	246
No. 398. GREY-RUMPED SWIFTLET, <i>Zoonava francica</i>	248
Plate 346, left-hand fig., lettered <i>Collocalia terræreginæ</i> , to face	248
Plate 346, right-hand fig., lettered <i>Collocalia terræreginæ</i> , to face	248
No. 399. UNIFORM SWIFTLET, <i>Zoonava fuciphaga</i>	255
Genus COLLOCALIA	260
Genus HIRUNDAPUS	261
No. 400. SPINE-TAILED SWIFT, <i>Hirundapus caudacutus</i>	269
Plate 347 lettered <i>Chætura caudacuta</i> , to face	269
Genus MICROPUS	275
No. 401. WHITE-RUMPED SWIFT, <i>Micropus pacificus</i>	276
Plate 348 lettered <i>Micropus pacificus</i> , to face	276
Order CUCULIFORMES	282
Genus CUCULUS	286
No. 402. ORIENTAL CUCKOO, <i>Cuculus optatus</i>	287
Plate 349 lettered <i>Cuculus optatus</i> , to face	287
Genus HETEROSCENES	291
No. 403. PALLID CUCKOO, <i>Heteroscenes pallidus</i>	293
Plate 350 lettered <i>Heteroscenes pallidus</i> , to face	293

THE BIRDS OF AUSTRALIA.

	PAGE
Genus CACOMANTIS	311
No. 404. FAN-TAILED CUCKOO, <i>Cacomantis rubricatus</i>	312
Plate 351 lettered <i>Cacomantis rubricatus</i> , to face	312
No. 405. SQUARE-TAILED (BRUSH) CUCKOO, <i>Cacomantis pyrrhophanus</i>	321
Plate 352 lettered <i>Cacomantis pyrrhophanus</i> , to face	321
Genus VIDGENIA	327
No. 406. CHESTNUT-BREADED CUCKOO, <i>Vidgenia castaneiventris</i>	328
Plate 353 lettered <i>Cacomantis castaneiventris</i> , to face	328
Genus OWENAVIS	331
No. 407. BLACK-EARED CUCKOO, <i>Owenavis osculans</i>	332
Plate 354 lettered <i>Owenavis rogersi</i> , to face	332
Genus CHALCITES	338
No. 408. NARROW-BILLED BRONZE CUCKOO, <i>Chalcites basalis</i>	339
Plate 355 lettered <i>Neochalcites basalis</i> , to face	339
Genus LAMPROCOCYX	348
No. 409. BROAD-BILLED BRONZE CUCKOO, <i>Lamprococcyx lucidus</i>	349
Plate 356 lettered <i>Lamprococcyx lucidus</i> , to face	349
No. 410. BRONZE CUCKOO, <i>Lamprococcyx plagosus</i>	354
Plate 357 lettered <i>Lamprococcyx plagosus</i> , to face	354
No. 411. LITTLE BRONZE CUCKOO, <i>Lamprococcyx minutillus</i>	361
Plate 358 (lower figure) lettered <i>Lamprococcyx minutillus</i> and (upper figure) <i>Lamprococcyx russatus</i> , to face	361
No. 412. RUFOUS-BREADED BRONZE CUCKOO, <i>Lamprococcyx russatus</i>	364
CUCKOO TAILS. Plate 359, to face	367
Genus EUDYNAMYS	369
No. 413. KOEL, <i>Eudynamys orientalis</i>	370
Plate 360 lettered <i>Eudynamys cyanocephalus</i> , to face	370
Genus SCYTHROPS	375
No. 414. CHANNEL BILL, <i>Scythrops novæhollandiæ</i>	376
Plate 361 lettered <i>Scythrops novæhollandiæ</i> , to face	376

CONTENTS.

	PAGE
Genus POLOPHILUS	383
No. 415. COUCAL, <i>Polophilus phasianinus</i>	384
Plate 362 lettered <i>Polophilus phasianinus</i> , to face	384
Order MENURIFORMES	392
Genus MENURA	394
No. 416. LYRE-BIRD, <i>Menura novæhollandiæ</i>	395
Plates 363-4 lettered <i>Menura victoriæ</i> and tails of Menuridæ, to face	394 & 395
Genus HARRIWHITEA	408
No. 417. NORTHERN LYRE-BIRD, <i>Harriwhitea alberti</i>	409
Plate 365 lettered <i>Harriwhitea alberti</i> , to face	409
Genus GLOBICERA	413
No. 418. QUEENSLAND PIGEON, <i>Globicera pacifica</i>	414
Plate 366 (lower figure) lettered <i>Globicera pacifica</i> , to face	414
Order PROCELLARIIFORMES	416
Genus REINHOLDIA	420
No. 419. FLUTTERING PETREL, <i>Reinholdia reinholdi</i>	421
Plate 367 lettered <i>Reinholdia reinholdi</i> , to face	421
No. 420. MOTTLED PETREL, <i>Pterodroma inexpectata</i>	425
Plate 368 lettered <i>Pterodroma inexpectata</i> , to face	425
No. 421. SNOWY ALBATROSS, <i>Diomedea chionoptera</i>	427
Plate 369 lettered <i>Diomedea chionoptera</i> , to face	427
No. 422. GOLDEN-SHOULDERED PARROT, <i>Psephotellus chryso-</i> <i>pterygius</i>	431
Plate 370 lettered <i>Psephotellus chrysopterygius</i> , to face	431
APPENDICES	435
INDEX	479

PREFACE.

AT the conclusion of this volume, the seventh of the series, it seems good to recapitulate and review the advancement that has been made during the progress of my work. I take this opportunity as this volume completes the description of the non-Passerine birds and these almost exactly number half the whole of the Avifauna.

When I undertook the task no one anticipated such a world confusion as later ensued and which has handicapped its preparation in every way. While the younger Australians have been engaged in the strenuous work of active competition against a war-prepared race and have come out with the highest battle honours, surpassed by none, the older Australian ornithologists have been writing that their petty studies should not conform to world views. The very active participation of the younger Australian ornithologists on the European battlefields suffices to show that it is impossible to withhold from conflict when such becomes necessary in war, and it is even so in peaceful science. The intervention of the younger Australians, while it has necessarily led to the greatest of sacrifices, has developed in the survivors a broader view of their scientific necessities. Thus it is that I foresee much vital progress in our science in the future when these younger ornithologists once more settle down to their peaceful studies. This is certain, as in their warlike pursuits they proved themselves endowed with the highest degree of ability, initiative and energy.

My endeavour throughout the present work has been to provide a good working basis for my successors, and I have to this end introduced much "controversial matter," so that these can form some judgment in the majority of cases. This feature has also met with criticism from the older school, but I feel will meet with approval later on. It is very difficult to deal with the older critics who write carelessly, accusing without attempt to deal with facts, and unwittingly these may influence workers who have not access to literature. I will quote one recent item only. A writer notes that Gould wrote "North-west Australia" and suggests that my selection of "Port Essington, Northern Territory" is carelessly inaccurate. Nevertheless he notes that Gould explained this in one instance. Witmer Stone drew up a List of the Gouldian species, which I published in the *Austral Avian Record*, Vol. I., Nos. 6 and 7, pp. 129-180, Feb. 28, 1913, wherein it was shown that the birds described from the "North-west Coast" were labelled "Port Essington." The explanation is very simple, as it was not until later that Gould discriminated between Port Essington and the lower North-west coast, which we now regard as North-west Australia, and accurately speaking, Port Essington was in North-west Australia. A parallel case is that Gould's early "New South Wales" included all the east coast, which is now divided into

THE BIRDS OF AUSTRALIA.

Queensland, New South Wales and Victoria. I have paid particular attention to all these details, correcting as I gather fresh facts, yet my careless critics take no notice of these important features.

It is, however, very pleasing that such are the only matters that critics have been concerned with, and that the wider and more important lines have been little discussed.

When the work was commenced the systematic nomenclature of birds was in a state of confusion and now it is progressing towards stability. Recently the British Ornithologists' Union suggested to the American Ornithologists' Union the preparation of a *Systema Avium*, a catalogue of the birds of the world wherein the nomenclature of the whole of the world's avifauna would be standardised, and this has been agreed upon. The co-operation of the Royal Australasian Ornithologists' Union has been asked for and accepted. Hence, as regards this question, we can look with equanimity into the future.

Now, the big task in front of Australian ornithologists is the working out of the life-histories of their common birds, and the co-operation of members situated apart must be instituted. The general distribution of the majority of species is now fairly well known, but the particular habitats are not so clearly defined. There is much to do in this direction.

With regard to assistance, I again have to thank Captain S. A. White, Dr. W. D. K. Macgillivray, Messrs. H. L. White, Tom Carter, Tom Tregellas, and many others whose names appear in the body of the volume.

A complaint was made as to the extent of this work, and when facts were produced petty excuses were provided.

The following appeared in the London papers of Sept. 6th, 1918, and will explain itself :—

RISEING COST OF PRINTING.—A meeting of over 200 members of the London Master Printers' Association yesterday approved a further large advance in wages to the members of the fifteen printing trade unions in London. The London Costing Committee reported that this would necessitate an addition of at least 15 per cent. to present charges for all classes of printing, making a total increase since the war began of over 100 per cent. in addition to the greatly increased cost of paper and other materials.—*Sept. 6, 1918.*

As this part concludes the non-Passerine birds and covers about half the species to be dealt with, I have prepared a List giving the correct names and synonymy up to the time of publication, correlating with these the figures given by Gould and myself.

GREGORY M. MATHEWS.

FOULIS COURT, FAIR OAK, HANTS.

12th June, 1919.

ORDER—PODARGIFORMES.

THE birds treated in this volume were placed in my Handlist in the Orders Coraciiformes, Coccoyges and Menuriformes. This classification was that of Sharpe, as displayed in the Handlist of Birds. This was accepted in my list, but herewith I make amendment, as it has become obvious that the inter-relationship of the forms is different to that expressed by the above.

I propose, therefore, to regard the groups which I named as families in my List, and which Sharpe has placed as suborders, as of ordinal rank, and hence we will have the orders Podargiformes, Coraciiformes, Alcediniformes, Meropiformes, Caprimulgiformes, Micropodiformes, Cuculiformes and Menuriformes.

Further, it is certain that the true *Podargus* are separable with at least family rank from *Ægotheles*: the Alcediniformes may prove divisible into families, and while this may be so in the Micropodiformes it is certain in the Cuculiformes.

The Podargiformes have a superficial resemblance to the Caprimulgiformes, but are not as nearly related as was commonly supposed when they were classed together, and even in 1898 Beddard, in the *Structure and Classification of Birds*, associated them, concluding the differences to be of family rank only. Beddard then wrote: "The relationship of the Caprimulgi (including the Podargiformes) to other groups is a puzzle hard of solution. This is partly, perhaps, due to the fact that the goatsuckers are probably a somewhat ancient group . . . It appears possible to place all these genera (*Podargus*, *Ægotheles*, *Steatornis*, etc.) in one family, which, on account of its greater antiquity, has had time to vary more than the Caprimulgidæ. It is also among members of this family that the greatest number of points of affinity to the owls is met with, a further argument in favour of their basal position . . . The remarkable series of modifications of the syrinx is one of the most striking facts in the anatomy of the group. They share this with the Cuculi and, though to a less extent, with the Striges. It is, indeed, with this latter group that the goatsuckers seem to be most nearly allied . . . Mitchell has found that of the various groups which may be supposed reasonably to be allied to the Caprimulgi the owls come nearest to them in the primitive character of the gut, while the cæca, swollen at the ends, are alike in both. The owls, too, are nearly the only other Coraciiform birds besides the Caprimulgi, which have well-developed basipterygoid processes." In the *Catalogue of the Birds in the British Museum*, Vol. XVI., published in 1892," Hartert had written: "The *Podargidæ* resemble the *Caprimulgidæ*, and

THE BIRDS OF AUSTRALIA.

especially the *Nyctibiinæ*, in their general appearance, but they differ entirely in the structure of the palate, which is desmognathous, in the absence of the oil-gland, and of the basipterygoid processes, and also in the manner of their nidification. The typical forms have a very broad and flat bill. The number of rectrices is always ten. The middle toe is not pectinated, the number of phalanges in the outer toe is not reduced. The sternum has two pairs of posterior notches . . . The young, when hatched, are helpless, but thickly covered with down . . . ”

Hartert separated the family into two subfamilies, Podarginæ and *Ægothelinæ*. I am regarding these divisions as of family rank. In the former only two genera were admitted, *Podargus* and *Batrachostomus*, the latter genus ranging from the Himalayas to Borneo and the southern Philippine Islands, the former being restricted to Papuasia, Australia and Tasmania. Hartert records as the chief difference between the two genera the difference in tail structure and the nesting habits.

Ægotheles, as will be noted later, is a very different form. Though Hartert regarded the three species “*Podargus*” *papuensis*, *strigoides* and *ocellatus* as congeneric, I have separated them as distinct genera, the variation in size and wing formula being noticeable. It is now twenty-five years since the sixteenth volume of the *Catalogue of Birds* was written, and the advancement in our science in that time has been very rapid, from whatever viewpoint we regard it. Nomenclature, most unsatisfying and yet most important, has now reached a stage where it concerns us very little. Subspecific differentiation has also passed its climax, and the nomination of different generic and subgeneric forms has been mostly accomplished. It is now possible to go ahead as regards the osteology and anatomy of the forms and thus fairly fix the relationships. When this has been accomplished we will be able to theorise as to the origin and movement of the forms and begin to grasp the forces which control evolution. We may find the factors which in some cases retard, in others advance evolutionary changes.

Thus, in the present case we have three forms of a group admittedly ancient, which so closely resemble each other as to be considered congeneric by the lumpers. One of these ranges over the whole of Australia and *Tasmania*, showing well-marked subspecies, though of very variable coloration as a species, while the other two simply range into the north-east corner. One of these has an outlier well down the east coast, which, isolated, seems to have arrived at an earlier period than its more northern congener. The other has no outlier but is confined to the northern limit of the continent, yet is a very marked subspecies. It seems that when the osteology and anatomy of these forms are made known that we shall find that our values of species and subspecies in this Order

PODARGIFORMES.

may need revision. An extra-limital confirmation seems provided by the allied genus *Batrachostomus*, which includes large and small forms also with peculiar distribution. It falls into groups, according to localities, the outliers having distinct features as regards superficial characters. It is quite possible that the species of "*Podargus*" may osteologically agree as to group characters with the corresponding groups of *Batrachostomus* and thus merely show convergence and not true relationship.

GENUS—P O D A R G U S .

PODARGUS Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXVII,
p. 151, 1818 Type *P. strigoides*.

LARGE Podargine birds with large broad bills, long wings, long wedge tails, and short legs and feet.

The bill is very broad at base and triangular in shape, the gape very large and the whole bill very depressed, the culmen keeled with a very prominent ridge, the sides flattened. The upper mandible has a prominent hooked tip, the edges straight and clean cut, not denticulate; the under mandible having the rami narrow and the sides straight, the tip decurved and hollowed to fit the hooked tip of the upper mandible; the interramal space fully feathered, bristles along the edges pointing outward; similar bristles occur along the sides of the gape and cover the nostrils, projecting forwards into a tuft as far as the end of the bill. The nostrils are completely hidden by bristles, and are hollow slits situated near the base of the bill and overhung by a membranous operculum. The wings are long and rounded, the fifth primary being longest, the fourth about equal to the sixth and much longer than the seventh, which exceeds the third, the first being little more than half the length of the fifth.

The tail is wedge shaped, almost as long as the wing, the two middle feathers attenuately pointed, the others less pointed.

The feet are small, the tarsus less than the middle toe in length. Three broad scutes can be counted in front, the back being very finely reticulated. The middle toe is long; the outer longer than the inner, which is longer than the hind-toe. The claws are long and sharp, midtoe not pectinated.



H. Grönvold, del.

Witherby & Co.

$\frac{2}{5}$
PODARGUS STRIGOIDES.
(TAWNY FROGMOUTH).



Roland Green, del.

Witherby & Co.

$\frac{3}{7}$

PODARGUS STRIGOIDES.
(TAWNY FROGMOUTH).

PODARGUS STRIGOIDES.

TAWNY FROGMOUTH.

(PLATES 325-326.)

CAPRIMULGUS STRIGOIDES Latham, Index Ornith. Suppl. II., p. lviii., 1801 : In Nova Hollandia = Sydney, New South Wales.

Strigoid G(oatsucker) Latham, Gen. Synops. Birds, Suppl. II., p. 262, 1801 : New South Wales ; *id.*, Gen. Hist. Birds, Vol. VII., p. 343, 1823.

Great-headed G(oatsucker) Latham, Gen. Synops. Birds, Suppl. II., p. 263, 1801 : New South Wales ; *id.*, Gen. Hist. Birds, Vol. VII., p. 364, 1823.

Gracile G(oatsucker) Latham, Gen. Synops. Birds, Suppl. II., p. 263, 1801 : New South Wales ; *id.*, Gen. Hist. Birds, Vol. VII., p. 344, 1823.

Caprimulgus strigoides Latham, Index Ornith., Suppl. II., p. lviii., 1801 : based on Strigoid Goatsucker of Latham ; Stephens, in Shaw's Gen. Zool., Vol. X., p. 143, 1817 ; Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 232, 1817.

Caprimulgus megacephalus Latham, Index Ornith., Suppl. II., p. lviii., 1801 : based on Great-headed Goatsucker of Latham ; Stephens, in Shaw's Gen. Zool., Vol. X., p. 141, 1817 ; Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 239, 1817.

Caprimulgus gracilis Latham, Index Ornith., Suppl. II., p. lviii., 1801 : based on Gracile Goatsucker of Latham ; Stephens, in Shaw's Gen. Zool., Vol. X., p. 145, 1817 ; Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 241, 1817.

"*Les Podarges*" Cuvier, Règne Animal, Vol. IV., p. 172 (pl. iv., fig. 1), 1816.

Podargus cinereus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXVII., p. 151, 1818 : New South Wales ; *id.*, Tabl. Encyc. Method Ornith., Vol. II., p. 547, 1822 ; *id.*, Galerie d'Oiseaux, p. 196, pl. 123, 1823 ; Gray, Genera Birds, Vol. I., p. 45, 1846.

Caprimulgus podargus Dumont, Dict. Sci. Nat. (Levrault), Vol. XIV., p. 504, 1819 : New name for *Podargus cinereus* Vieillot.

Wedge-tailed Goatsucker Latham, Gen. Hist. Birds, Vol. VII., p. 368, 1823 : New Holland, in coll. Lord Stanley.

Cold-river Goatsucker Latham, *ib.*, p. 369 : Cold River, New Holland.

Podargus australis Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. II., p. 92, 1826 : New South Wales.

Podargus stanleyanus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 197, 1827 : based on Wedge tailed Goatsucker of Latham from New South Wales ; Gray, Genera of Birds, Vol. I., p. 45, 1846 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 57, 1850.

THE BIRDS OF AUSTRALIA.

- Podargus humeralis* Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 198, 1827: New South Wales; Jardine and Selby, Illus. Ornith., Vol. II., pl. 88, 1830; Gray, Genera of Birds, Vol. I., p. 45, 1846; Gould, Birds Austr., pt. 1 (Vol. II., pl. 3), 1840; Bonaparte, Consp. Gen. Av., Vol. I., p. 57, 1850.
- Podargus cuvieri* Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 200, 1827: Tasmania; Gould, Birds Austr., pt. xxvi. (Vol. II., pl. 4), 1847; Bonaparte, Consp. Gen. Av., Vol. I., p. 57, 1850; Gould, Handb. Birds Austr., Vol. I., p. 87, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Legge, Papers Proc. Roy. Soc. Tasm., 1886, p. 238, 1887; Ramsay, Tab. List Austr. Birds, p. 2, 1888; North, Austr. Mus. Cat., No. 12, p. 27, pl. vi., fig. 4, 1890.
- Podargus strigoides* Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 194, 1843; Gould, Handb. Birds Austr., Vol. I., p. 84, 1865; Ramsay, Ibis, 1866, p. 326 (N.Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Ramsay, Tab. List Austr. Birds, p. 2, 1888; North, Austr. Mus. Cat., No. 12, p. 26, pl. vi., fig. 3, 1890; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 631, 1892; *id.*, Ibis, 1896, p. 374; Hall, Key Birds Austr., p. 55, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 539, 1901; H. E. Hill, Emu, Vol. II., p. 161, 1903 (Vic.); Carter, *id.*, Vol. III., p. 95, 1903 (M.W.A.); Milligan, *id.*, Vol. IV., p. 2, pls. i., ii., 1904 (W.A.); D'Ombraïn, *id.*, p. 161, 1905 (Vic.); Berney, *id.*, Vol. VI., p. 43, 1906 (N.Q.); Batey, *id.*, Vol. VII., p. 4, 1907 (Vic.); Austin, *id.*, p. 31, 1907 (N.S.W.); Mathews, Handl. Birds Austr., p. 52, 1908; Howe, Emu, Vol. VIII., p. 135, 1909 (Vic.); North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 335, 1909; Whitlock, Emu, Vol. VIII., p. 188, 1909 (W.A.); Ogilvie Grant, Ibis, 1910, p. 159 (W.A.); Littler, Handb. Birds Tasm., p. 78, 1910 (Tas.); Hall, Emu, Vol. IX., p. 130, 1910 (S.A.); Mattingley, *ib.*, Vol. X., p. 246, 1910; Carter, *ib.*, p. 295, 1911 (W.A.); Stone, *ib.*, Vol. XII., p. 117, 1912 (Vic.); S. A. White, *ib.*, Vol. XIII., p. 24, 1913 (S.A.); Cheney, *ib.*, p. 215, 1914 (Vic.); S. A. White, *ib.*, Vol. XIV., p. 187, 1915 (Centr.); Cheney, *ib.*, p. 206 (Vic.); Cook, *ib.*, Vol. XV., p. 52, 1915 (Vic.); Alexander, *ib.*, p. 55, 1915 (W.A.).
- Podargus phalænoides* Gould, Proc. Zool. Soc. (Lond.), 1839, p. 142, 1840: North-west Coast Australia=Port Essington, Northern Territory; Gray, Genera Birds, Vol. I., p. 45, 1846; Gould, Birds Austr., pt. xiii. (Vol. II., pl. 5), 1844; Bonaparte, Consp. Gen. Av., Vol. I., p. 57, 1850; Gould, Handb. Birds Austr., Vol. I., p. 90, 1865; Diggles, Orn. Austr., pt. x., 1866; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 45, 1875 (N.Q.); Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 581 (N.Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 634, 1892; Le Souëf, Ibis, 1897, p. 393 (Q.); Hall, Key Birds Austr., p. 55, 1899; Robinson and Laverock, Ibis, 1900, p. 637 (N.Q.); Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 540, 1901; Hall, Emu, Vol. II., p. 51, 1902 (N.W.A.); Hartert, Nov. Zool., Vol. XII., p. 215, 1905 (N.W.A.); Hall and Rogers, Emu, Vol. VII., p. 141, 1908 (N.W.A.); Mathews, Handl. Birds Austr., p. 52, 1908; Ingram, Ibis, 1908, p. 466 (N.Q.); Mathews, Emu, Vol. IX., p. 68, 1909 (N.T.); Gibson, *ib.*, p. 75 (S.W.A.); Mathews,

TAWNY FROGMOUTH.

- ib.*, Vol. X., p. 109, 1910 (N.W.A.); Broadbent, *ib.*, p. 234 (N.Q.); G. F. Hill, *ib.*, p. 270, 1911 (N.W.A.); Witmer Stone, Austr. Av. Rec., Vol. I., p. 151, 1913; Macgillivray, Emu, Vol. XIII., p. 158, 1914 (N.Q.); Barnard, *ib.*, p. 206 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.).
- Podargus brachypterus* Gould, Proc. Zool. Soc. (Lond.), 1846, p. 163: Swan River, West Australia; Gray, Genera Birds, Vol. I., p. 45, 1846; Gould, Introd. Birds Austr., 8vo ed., p. 26, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 89, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 634, footnote, 1892; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 340, 1909; Whitlock, Emu, Vol. IX., p. 193, 1910 (W.A.); Mathews, *ib.*, Vol. X., p. 323, 1911; Witmer Stone, Austral Av. Rec., Vol. I., p. 151, 1913; Macgillivray, Emu, Vol. XIII., p. 158, 1914 (N.Q.).
- Podargus macrorhynchus* Gould, Proc. Zool. Soc. (Lond.), 1846, p. 163: Alternative name for *P. brachypterus*, *id.*, *ib.*; Witmer Stone, Austral Av. Rec., Vol. I., p. 151, 1913.
- Podargus megacephalus* Gray, Genera Birds, Vol. I., p. 45, 1846; Gould, Introd. Birds Austr., 8vo ed., p. 26, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 89, 1865; Pelzeln, Ibis, 1873, p. 107; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888.
- "Podarge de Vincendon" Atlas, Voy. Pôle Sud, pl. 21, fig. 1, A., Jan., 1846.
- Podargus vincendonii* Jacquinet et Pucheran, Voy. Pôle Sud Zool., Vol. III., p. 92, 1853: "Borneo" errore = Raffles Bay, Northern Territory.
- Caprimulgus humeralis* Koenig-Warthaussen, Journ. für Orn., 1868, p. 383.
- Podargus gouldi* Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 45, 1875: Kimberley, Norman River, Gulf of Carpentaria; Ramsay, *ib.*, Vol. II., p. 178, 1878; Masters, *ib.*, p. 270, 1878 (N.T.); Ramsay, *ib.*, 2nd Ser., Vol. I., p. 1097, 1886 (N.W.A.); *id.*, *ib.*, Vol. II., p. 166, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 2, 1888; Mathews, Austral Av. Rec., Vol. II., p. 135, 1915.
- Podargus strigoides strigoides* Hartert, Nov. Zool., Vol. XII., p. 216, 1905; Mathews, *ib.*, Vol. XVIII., p. 282, 1912; *id.*, List Birds Austr., p. 141, 1913.
- Podargus strigoides phalaenoides* Hartert, Nov. Zool., Vol. XII., p. 216, 1905; Sassi, Journ. für Orn., 1909, p. 381 (N.Q.); Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912; *id.*, List Birds Austr., p. 142, 1913.
- Podargus strigoides cornwalli* Mathews, Nov. Zool., Vol. XVIII., p. 282, 1912; Mackay, Queensland; *id.*, List Birds Austr., p. 142, 1913.
- Podargus strigoides victoriæ* Mathews, Nov. Zool., Vol. XVIII., p. 282, 1912: Bayswater, Victoria; *id.*, Austral Av. Rec., Vol. I., p. 56, 1912; *id.*, List Birds Austr., p. 141, 1913.
- Podargus strigoides cuvieri* Mathews, Nov. Zool., Vol. XVIII., p. 282, 1912; *id.*, List Birds Austr., p. 142, 1913.
- Podargus strigoides rossi* Mathews, Nov. Zool., Vol. XVIII., p. 282, 1912: South Australia; *id.*, List Birds Austr., p. 141, 1913; Mellor, Emu, Vol. XV., p. 53, 1915 (S.A.).
- Podargus strigoides brachypterus* Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912; *id.*, List Birds Austr., p. 142, 1913.

THE BIRDS OF AUSTRALIA.

- Podargus strigoides mungi* Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912: Mungi, North-west Australia; *id.*, List Birds Austr., p. 142, 1913.
- Podargus strigoides dendyi* Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912: Derby, North-west Australia; *id.*, Austral Av. Rec., Vol. I., p. 56, 1912; *id.*, South Austr. Ornith., Vol. III., p. 70, 1917 (N.W.A.).
- Podargus strigoides gouldi* Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912; *id.*, Austral Av. Rec., Vol. II., p. 79, 1913; *id.*, List Birds Austr., p. 142, 1913.
- Podargus strigoides melvillensis* Mathews, Austral Av. Rec., Vol. I., p. 37, 1912: Melville Island, Northern Territory; *id.*, List Birds Austr., p. 142, 1913; *id.*, Ibis, 1914, p. 90; Zietz, South Austr. Ornith., Vol. I., p. 14, 1914.
- Podargus rossi* Wilson, Emu, Vol. XII., p. 32, 1912 (Vic.); Chandler, *ib.*, Vol. XIII., p. 37, pl. VII., 1913 (Vic.).

DISTRIBUTION. Australia; Tasmania.

Adult male. General colour of the upper surface, including the head, back, wings and tail, chocolate-brown, mottled and vermiculated with cream-white, black and grey which assume the form of bars on the flight-quills and tail-feathers, some of the scapulars much paler than the back; the white pattern coarser and more profuse on the head, the black pattern on the head, back, upper wing-coverts, scapulars, and innermost secondaries take the form of shaft-lines, many of which are globular or pear-shaped at the tips of the feathers which are marked with white; flight-quills blackish-brown marked with white on the outer-webs, some of the outer ones also marked with hazel-brown, as are also some of the upper wing-coverts; inner-webs of flight-quills with speckled bars and mottled with brown at the tips; tail mottled with grey, brown, and black which assume the form of ill-defined bars; the feathers at the nostrils and base of the bill disintegrated and hair-like, those on the sides of the forehead and in front of the eye rust-brown; hinder face and ear-coverts grey intermixed with rufous and a broad streak of black feathers from the gape stretching backwards along the cheeks; throat and breast grey intermixed with brown, with blackish shaft-streaks to the feathers; throat and breast cinnamon-brown freckled with white and longitudinally streaked with blackish, the streaks expanding out on the sides of the breast; abdomen, under tail-coverts, and sides of the body similar but more coarsely marked, which gives a somewhat paler appearance; thighs blackish; under wing-coverts similar to the under-surface of flight-quills which are greyish-brown with whitish mottled bars; lower aspect of tail grey mottled with brown and pervaded with a golden tinge. Total length 500 mm.; culmen 33, wing 290, tail 220, tarsus 32. Figured. Collected at Hunter's Hill, near Sydney, New South Wales.

Adult female. General colour above chestnut speckled, mottled, spotted, and streaked with white, grey and black; the black occupying the middle or shaft of the feathers on the head, back, and wings; on the fore-part of the head it widens out, becoming pear-shaped towards the pale tips; a broad eyebrow is formed over and behind the eye by the silvery-grey specklings to the feathers, the black shaft-streaks are narrower on the hind-neck, mantle and back; outer scapulars paler than the back; the proximal lesser upper wing-coverts black, becoming dusky on the distal portion, median series like the back, many of the greater series speckled with white; innermost secondaries cinnamon mottled with grey and brown and with dark shaft-lines to the feathers; bastard-wing, primary-coverts and flight-quills black marked with white and hazel-brown on the outer-webs and pale mottled bars on the inner-webs, the markings on the secondaries inclining to cinnamon; rump and upper tail-coverts rather darker than the back; tail cinnamon-brown with mottled

TAWNY FROGMOUTH.

bars of grey and black, more coarsely marked on the lateral feathers, the outermost pair somewhat paler and marked with white on the outer-webs; the feathers surrounding the nostrils and base of the bill disintegrated and hair-like; sides of the forehead in front and below the eye chestnut-brown like a patch on the sides of the neck; cheeks grey; throat and entire under-surface, including the under wing-coverts, pale cinnamon intermixed with white and with black longitudinal shaft-streaks; axillaries pale ochreous; under-surface of flight-quills greyish-brown with pale mottled bars; lower aspect of tail cinnamon-grey with dark mottlings, thighs blackish-brown. Bill light brown, eyes bright yellow, feet light brown (lighter than the bill), gape sulphur yellow. Total length 450 mm.; culmen 25, wing 267, tail 200, tarsus 31. Figured. Collected at Woy Woy, New South Wales, on the 27th of May, 1915.

These represent the "grey" and the "red" phases, but adult females are also met with that show the grey phase, but no male adult occurs in the red phase.

Adult female. General colour above and below cinnamon-brown, everywhere freckled with silvery-white and dark shaft-streaks which are usually pear-shaped at the tip and terminated with white; the scapulars paler and inclining to smoky-brown contrasting with the back; marginal wing-coverts above and below whitish marked with smoke-brown like the outer under wing-coverts; lesser upper wing-coverts chestnut-brown irregularly marked with black and white; bastard-wing and primary-coverts dark brown with pale mottlings; primary- and secondary-quills brown with pale mottled bars which are paler on the outer-webs, the innermost secondaries like the back; tail cinnamon-brown with pale mottlings which assume the form of irregular bars, a subterminal black spot edged with white at the tips of the middle feathers; crown of head somewhat darker than the back, the feathers minutely tipped with white more conspicuously on the sides of the forehead; the feathers at the base of the bill and on the eyelids black and hair-like in structure, those at the base of the forehead erectile; under surface rather paler than the upper-parts, especially the under tail-coverts, but the colours similarly distributed; axillaries and inner wing-coverts isabelline; under-surface of quills greyish-brown with whitish mottled bars; lower aspect of tail pale cinnamon with whitish mottlings and irregular dark markings. Eyes yellow: feet and tarsus olive-brown; bill olive-brown; culmen brown. Total length 372 mm.; culmen 30, wing 207, tail 165, tarsus 26. Figured. Collected on Melville Island, Northern Territory on the 20th February, 1912.

Adult male. Similar to the adult female (Melville Island 24/6/12). Perhaps on the whole the females are browner in their general coloration.

Immature. Soon acquire the marbled appearance of the adult.

Nestlings are hatched covered with a whitish down.

Nest. An open structure composed of sticks placed loosely together.

Eggs. Clutch two. White with a slight gloss 42 to 47 mm. by 29-32 (Victoria, October), 37 to 40 by 26 to 29 (Derby, December).

Breeding-season. August to December.

THE early history of this bird is mainly on the technical side and will be treated hereafter. Here it may be observed that it was first described by Latham in 1801, from a series of paintings made at Sydney, New South Wales, and on account of the variation observed it was thrice named by that famous ornithologist. Naturally no life-history was known save the artist's notes on the paintings, which read: "Native name is *Birreagal* July" and "Native name is *Poo-book*."

THE BIRDS OF AUSTRALIA.

There is not much in these, save that the latter will be the first record of the native name "*Poo-book*" being given to this bird, a rather interesting item in view of recent discussions as to the call of this bird. When Vigors and Horsfield handled specimens they did not do much better than Latham, as they admitted three species, two from New South Wales and one from Tasmania. Still no life-history was recorded, the only note reading: "Mr. Caley calls all these birds by the native name of *Benit*. He observes that they are night birds, and seem stupefied when found upon the wing by day."

Consequently it was left for Gould to record their habits, and he wrote as follows: "The Tawny-shouldered *Podargus* is plentifully dispersed over New South Wales, where it is not restricted to any peculiar character of country, but inhabits alike the thick brushes near the coast, the hilly districts, and the thinly wooded plains of the interior. I found it breeding on the low swampy islands studding the mouth of the Hunter, and on the Apple-tree (*Angophora*) flats of Yarrundi, near the Liverpool Range. Like the rest of the genus, this species is strictly nocturnal, sleeping throughout the day on the dead branch of a tree, in an upright position across, and never parallel to, the branch, and which it so nearly resembles as scarcely to be distinguishable from it. I have occasionally seen it beneath the thick foliage of the *Casuarinæ*, and I have been informed that it sometimes shelters itself in the hollow trunks of the *Eucalypti*, but I could never detect one in such a situation; I mostly found them in pairs, perched near each other on the branches of the gums, in situations not at all sheltered from the beams of the midday sun. So lethargic are its slumbers, that it is almost impossible to arouse it, and I have frequently shot one without disturbing its mate sitting close by; it may also be knocked off with sticks or stones, and sometimes is even taken by hand; when aroused it flies lazily off with heavy flapping wings to a neighbouring tree, and again resumes its slumbers until the approach of evening, when it becomes as animated and active as it has been previously dull and stupid. The stomach of one I dissected induced me to believe that it does not usually capture its prey while on the wing, or subsist upon nocturnal insects alone, but that it is in the habit of creeping among the branches in search of such as are in a state of repose. The power it possesses of shifting the position of the outer toe backwards, as circumstances may require, is a very singular feature, and may also tend to assist them in their progress among the branches. A bird I shot at Yarrundi, in the middle of the night, had the stomach filled with fresh-captured mantis and locusts (*Phasmidæ* and *Cicadæ*), which seldom move at night, and the latter of which are generally resting against the upright boles of the trees. In other specimens I found the remains of small coleoptera, intermingled with the fibres of the roots of what appeared to be a parasitic plant, such as would

TAWNY FROGMOUTH.

be found in decayed and hollow trees. The whole contour of the bird shows that it is not formed for extensive flight or for performing those rapid evolutions that are necessary for the capture of its prey in the air, the wing being short and concave in comparison with those of the true aerial Nightjars, and particularly with the Australian form to which I have given the name of *Eurostopodus*. Of its mode of nidification I can speak with confidence, having seen many pairs breeding during my rambles in the woods. It makes a slightly-constructed flat nest of sticks carelessly interwoven together, and placed at the fork of a horizontal branch of sufficient size to ensure its safety; the trees most frequently chosen are the *Eucalypti*, but I have occasionally seen the nest on an Apple-tree (*Angophora*) or a Swamp-Oak (*Casuarina*). In every instance one of the birds was sitting on the eggs and the other perched on a neighbouring tree, both invariably asleep; that the male participates in the duty of incubation I ascertained by having shot a bird on the nest, which on dissection proved to be a male. . . . Like the other species of the genus, it is subject to considerable variation in its colouring; the young, which assume the adult livery at an early age, being somewhat darker in all their markings. In some a rich tawny colour predominates, while others are more grey. The night call of this species is a loud, hoarse noise, consisting of two distinct sounds, which cannot be correctly described. The stomach is thick and muscular, and is lined with a thick, hairlike substance like that of the Common Cuckoo."

Gould recognised the Tasmanian race as a distinct species, and I give his notes hereafter, but here it may be noted that he gave as its name "More-pork of the residents of Tasmania," and observed, "Like the owl, it is considered by superstitious people a bird of ill omen, principally from the extraordinary sound of its hoarse, unearthly cry, which resembles the words *more pork*; it approaches the immediate vicinity of the houses and frequently emits this sound while perched on their verandahs."

In the *Handbook*, Vol. I., p. 89, 1865, Gould included *Podargus megacephalus*, writing: "I believe I have good grounds for regarding the *Podargus megacephalus* as distinct from *P. humeralis*. For many years two birds of this form have lived in the Gardens of the Zoological Society, one of which is doubtless the *P. humeralis*; the other, which is much larger and possesses greatly developed mandibles, is to all appearance distinct, and is so considered by the keeper who has charge of these Nocturnes . . . but I must admit the question is an open one." Gould was unaware when he wrote this that *P. megacephalus* was simply based on an exaggerated drawing of the form he called *P. humeralis*.

Captain S. A. White has forwarded me the following notes concerning *Podargus strigordes*:—"I am very uncertain about there being two subspecies in Victoria and South Australia, while sometimes I think there is a subspecies on the

THE BIRDS OF AUSTRALIA.

Coastal belt in the large timber, and another in the Mallee and Interior. The bird found in the Mallee some distance from the sea does not differ much from the Interior Mulga Scrub bird. Those birds found up to eighty to one hundred miles from the coast are very dark in comparison to the Interior bird. This bird spends most of its time during the daylight sitting almost motionless on the branch of a tree; if there be more than one, they will sit in the same direction as the branch with the bill resting on the back of the bird immediately in front giving the appearance of a dead bough or limb; have seen two immature birds sitting between the parent birds. A few years ago a pair of these birds put in their appearance at my old home on the Reed-beds, and I had a good chance to observe them as they roosted in a tree within ten or fifteen yards of the house; they brought up young every year, in some instances two broods. They are very local birds, returning each morning to the same tree and branch; each year a pair of young birds have taken up a fresh locality for themselves and have spread over the country into the neighbouring estates. It has been put forward by some that this bird gives the Boo-book call. This is not right, for during the many years that these birds have been within touching distance never once did they give this call. The call they make is a low booming or grunting note, easily imitated by closing the mouth and making a grunting sound through the nose. They sit so still and simulate the bark of the trees so well that often the most experienced eye will fail to detect them. As far as I know, they live entirely on insects: nothing else have I found in the stomachs examined. Have found them nesting in August, September, October and November. It is widely distributed over the whole of South Australia and as far north of the MacDonnell Ranges as I have been."

Mr. L. G. Chandler from Victoria wrote: "I regarded this bird for many years as a very inoffensive creature. In numerous cases when I had examined a nest containing eggs or young, the owner had departed without offering any opposition. On one or two occasions, certainly, the bird had glared at me from a neighbouring tree, but it had never ventured to attack. At Frankston, Victoria, on the 11th of December, 1910, in company with my father, I met with a very pugnacious example of this species. I detected a nest on a horizontal fork of a *Eucalyptus*, about twenty-five feet from the ground. The bird was sitting in its characteristic attitude. A short search on the ground revealed fragments of egg shells. I was anxious to examine the young, so commenced to climb the tree. When about ten feet from the bird I threw a small piece of bark at it. Instead of flying off the nest, as I expected, it opened its eyes and looked very savage. Several attempts to dislodge the bird were of no avail. I determined now to find out how much opposition it would give if confronted with a stick.

TAWNY FROGMOUTH.

Securing a long stick from the ground, I endeavoured to push the *Podargus* off the nest, but it stubbornly refused to move. Of course, had I used it roughly, no doubt it would have flown, but I did not wish to hurt this curious creature. While engaged with the stick I noticed a curious fact. The bird took scarcely any notice of the stick, but all the time kept its great staring eyes on my face. It made no attempt to peck at the former. My next action was to climb along the limb to the nest and see if I could handle the owner. I had scarcely started, when the *Podargus* raised itself on its short legs. It had worked itself at last into a perfect fury. Extended to its full height, with wings outstretched and its large yellow eyes glaring with looks of deadliest hatred and enmity, it looked a perfect picture of defiance. I was filled with admiration, and sadly regretted the absence of a camera. Suddenly it left its nest and came at me like an arrow. The unexpectedness of the attack nearly knocked me out of the tree, and I 'ducked' involuntarily. However, the bird merely brushed me with its wing as it passed and, settling on a limb of an adjacent tree, called 'oom, oom' several times, glaring at me the while. It did not renew the attack, however. Passing the spot several hours later, I noticed the bird had not returned to its nest and young."

Mr. Christian wrote from Victoria: "*P. strigoides* is not very common here, but I see it now and again. In its flight it is very swift and noiseless. It is a very valuable bird, eating large moths, mice and many other noxious things. It will lie along a bough, and then it looks like a lizard or an iguana. The greyiness of its feathers, especially when it is young, resembles a small broken twig. It will sit bolt upright in a fork during the day for hours, and many would pass it for part of the tree."

Mr. T. H. Tregellas, from Hawthorn, Victoria, noted: "During the season I have had eight nests under observation. A peculiar thing in connection with the nests I noticed was that whilst in the Ringwood district the nests were the merest platforms and barely sufficient to retain the eggs or young, those found in the coastal district around Frankston were much larger, hollowed out like a dish, and lined with leaves of the eucalyptus. At Wonga Park, near Ringwood, I heard the *Podargus* calling repeatedly through the night, and early next morning went to the gully whence the calls came and saw the old bird sitting on two newly-fledged young. I had a laborious climb to this nest and took photos of it and the young. Returning a fortnight later I was amazed to find the young not half grown, and the conviction was forced on me that it was the precarious living that retarded their growth. I think that, being fed only at night, and on some nights very little on account of the scarcity of insect food, they had been kept back in their development. Another nest I found was a very primitive structure of rough sticks with no lining, and held two eggs in an

THE BIRDS OF AUSTRALIA.

advanced state of incubation. The bird on this nest refused to leave till forcibly ejected by means of a stick, and she returned immediately I left the nest. The same thing happened at Frankston on one of my visits, the old bird evidently knowing that the young were nearly hatched, and being loth to leave the nest. I always pity the poor *Podargus* when sitting on its nest, it seems such a lonely, lost kind of a bird, and looks so ludicrous when blinking at me in the sun. I would not be bold enough to say I can tell the male at first sight alive, but will say that the actions of the male nearly always proclaim him. In the nesting-season there is no difficulty, as I have never found him on the nest; he is always in the neighbourhood and generally about a quarter of a mile from the nest."

Mr. F. E. Howe wrote me, but as two different subspecies are referred to I interpose here some notes from Mr. Frank Littler regarding the Tasmanian form. He observed: "It is active only during the night, at which time it sallies forth on noiseless wings and feeds on moths and other nocturnal insects. During the day it sits in an almost upright attitude on the dead bough of a tree; when disturbed in the daytime it will fly a short distance, then perch and go to sleep. The cry is a rapid pulsating hooting sound, repeated many times."

Gould wrote: "(In Tasmania) very numerous, as evidenced by the frequency with which I encountered it during my rambles over the country. I observed it both among the thick branches of the *Casuarinæ* and on the dead limbs of the *Eucalypti*; it appeared, however, to evince a greater partiality for the latter, which it closely resembles in colour, and from the position in which it rests, looks so like a part of the branch itself as frequently to elude detection; it is generally seen in pairs sitting near each other, and frequently on the same branch. Like the other members of the genus, this bird is strictly nocturnal, and feeds almost exclusively on insects, of which coleoptera form a large part. It is frequently captured and kept in captivity in Tasmania, where it excites attention more from the sluggishness of its nature and the singular position it assumes than from any other cause."

Mr. F. E. Howe has written me: "At Ringwood, Victoria, we often came across this strange bird, and it is also very common in the Bacchus Marsh district. Its mimicry of a piece of dead wood is very remarkable and protective. Although it is nocturnal it has fairly good sight in the daytime, and when you chance upon it, it has already seen and is keenly watching you. The nest is made of fine twigs and sticks, and is placed sometimes on a horizontal bough or on a broken spout or in a fork from the butt. When sitting on the nest it is very like a grey and broken stick, the head is held well up, and the feathers protruding above the bill further help it to deceive you. As you stand beneath the tree the female (?) slightly leans over to look at you, and as you go the other

TAWNY FROGMOUTH.

way she follows, but very slowly. In this position they just look like a huge lizard. They are exceedingly local and return to the same tree to nest year after year. In September, 1907, my brother found a nest containing one egg and gave me the directions in which to find it. These were followed out and the nest found. Passing that way in 1908 (October 11th), we had a look at the tree and found the bird sitting on a heavily incubated egg. The egg was left to hatch out and a well-grown young was taken on the afternoon of November 4th. The female was sitting on the young bird, and as Mr. Mattingley climbed the tree it allowed him to approach within a few feet before flushing. At the same time the mate flew from a tree close by. She only flew a few yards into an adjoining tree and with craning neck watched operations, and as the young was lifted from the nest uttered a fierce 'Oom oom oom oom,' very quickly repeated. When sitting on eggs or young the mate is always found close by. I have seen them perched as low down as twelve feet from the ground, and then the eyes are nearly closed, leaving just a narrow slit, but throw a stick and see how soon they are on the alert. Mr. C. M'Lennan assures me that they utter the 'More Pork' call, but I have never heard it. In the Mallee scrubs, during September, 1908, we found two nests, each containing two eggs of a *Podargus*. The nests were very substantial structures and were composed of green twigs of an acacia, and in no way like those found near Melbourne; the eggs, too, were only about three-quarter size of eggs found at Ringwood and others taken at Blacktown, New South Wales, and it was unfortunate that a specimen was not obtained, as I believe it to be a new species or at least a subspecies."

Howe recorded this item regarding the Mallee bird in the *Emu*, Vol. VIII., p. 135, 1909, and then in the next volume, p. 230, added: "Regarding this form, I mentioned in a previous paper that it appeared to be variable if not new, and that the eggs were much smaller than those of *P. strigoides*. A few more nests, each containing two eggs, were found, and the variation was constant. Two males flushed from nests were secured as specimens. Specimen *a* measured 17 inches in length; *b*, $16\frac{3}{4}$ inches. Wing of *a*, from shoulder, 10 inches; *b*, $9\frac{3}{4}$ inches. Tarsus of *a*, $3\frac{1}{4}$ inches; *b*, 3 inches. The irides were orange, and the bill and feet black."

A specimen was sent to me, and when I prepared my Reference List in 1912 I reviewed the species and named the Mallee form *Podargus strigoides rossi*.

Wilson, in the *Emu*, Vol. XII., p. 32, 1912, giving an account of an Oologist's trip in the Mallee, wrote: "*Podargus rossi* (Mathews). This bird, which Mr. Mathews has, I think, rightly described as a new species, was met with both at Ouyen and Kow Plains. At both these places a nest was found containing two fresh eggs. The eggs, as has been pointed out by

THE BIRDS OF AUSTRALIA.

Mr. F. E. Howe, are considerably smaller than those of *Podargus strigoides*. In both the nests I examined green twigs of the turpentine shrub had been incorporated in the structure, which was otherwise made of dry twigs of the Mallee Eucalypt. The nest is the same shape and about the same size as that of *Podargus strigoides*, and is placed on a horizontal fork."

Chandler, in Vol. XIII., p. 37, 1913, gave a plate of the nests and eggs of *Podargus rossi* on the Kow Plains, writing: "Except when a nest was located this bird was rarely seen."

The South Australian form is referable to this Mallee small subspecies, and Captain S. A. White has written me: "A few of these birds were met with in the Flinders Ranges, but they were not numerous. One was found nesting in a Myall tree in the centre of the Ranges, and on flushing the bird from the nest two eggs were found slightly incubated. The sitting bird proved to be a male."

Mr. J. W. Mellor has forwarded me the following account: "This bird was once fairly plentiful at the Reedbeds near Adelaide, but owing to the advance of civilisation it was killed out or driven away, but now, owing to strict protection, a few come about in our paddocks, and they are increasing, their peculiar mournful cooing note being often heard at night, as the bird sits motionless in some dead gumtree and emits the sound 'Coo-coo-coo-coo,' several times repeated. This sound is made during the mating- and breeding-season, which is from August to November, but a late clutch may be found as late as December. The nest is a sparsely made structure of cobwebs and fine fibres, loosely interwoven between a fork of a tree that lies in a horizontal position, the bird thus being able to sit on the nest with its tail lying along the bough and its head projecting between the fork of the bough, from which place it can watch everything below; it lies very flat on the nest, and the head, with the bristles about the bill, makes the bird look like a piece of broken dry wood, and the colour of the feathers being greyish-brown with longitudinal markings, the protective coloration is complete, so that neither enemies from above nor those below can easily detect the Frogmouth on its nest, and in this position it lies as still as though lifeless and will only fly off when you climb close to the nest; the eggs are two in number, of a somewhat oval shape, and owing to the very flat shape of the nest would easily get knocked off this frail platform were it not for the quiet and careful disposition of the bird. The young when hatched are balls of whitish down, for some time until the feathers start to arrive, and then the down seems to grow on the ends of them, and eventually disappears altogether. The feathers of the old birds are exceedingly soft and silky, allowing the birds to go through the air with noiseless flight; it can thus capture its food with ease, opening its huge wide

TAWNY FROGMOUTH.

mouth as it sails through the air, there is little chance of missing the insects and moths upon which it feeds, and, being a night bird, there is abundance of this food, especially in the spring and summer time ; it is therefore a most useful bird in eating up many night-flying moths, which do damage to the orchard, garden and field. This bird is often confounded with the 'Morepork' or Boobook Owl, as it was believed by some that it was this bird that said 'Morepork' at night, and by others that both the birds said this note. Years ago I wrote vigorously upon the matter and I had a hard job to convince many of our Australian ornithologists that this bird never had that note and the Boobook Owl was the bird that made it, but I think at last they accept it as correct ; having had close observations of both the birds, I know them well. I have seen this bird on Eyre's Peninsula, South Australia, on several of my visits there, where it was seen breeding. At the camp at Warunda, in October, 1909, these birds were observed with fresh eggs and also large young in the nest. I have noted them in the Mount Lofty Ranges, South Australia, also."

Mr. Edwin Ashby's notes read : " This species is common in the Adelaide Hills. Some birds are very dark with chestnut blotches on the plumage ; others are almost a uniform grey. I have also met with it in Southern Tasmania. In reference to the cry of this bird I have known them emit a sort of hissing sound when they are disturbed in some hollow log, but my friend Mr. Wells, of Latrobe, Tasmania, who is a bird observer, answers me that he has watched a *Podargus* (sitting on a fence) which made the cry 'Morepork' accredited to the Boobook Owl ; he saw it open its beak as it emitted the sound and he shot the bird in the act. I myself on one occasion shot a bird that apparently was making this cry and found on picking up the specimen that it was the Boobook Owl."

There are few notes regarding the typical subspecies, which may become a rare bird ; its colour-variation seems the most pronounced, and red birds seem most highly coloured from this locality. So far as my results show, this ruddy coloration is a feminine feature, but not a sexual character. That is, all the red birds I have examined have been females, but all females are not red. I have observed also that throughout Australia the birds showing a pronounced rusty coloration have been females, so that we have here an interesting item. I further suggest that this rufous coloration is a juvenile phase which has been lost in the plumage changes now seen, but is apt to recur in the females under certain conditions when the environmental complexes are suitable. This theory is borne out by consideration of the species *P. papuensis* Q. and G., as I find the ruddiest specimens in that group also to be females, and this may also account for the peculiar coloration of *P. plumiferus* Gould. I can only

THE BIRDS OF AUSTRALIA.

draw attention to such matters with the hope that some field naturalist will take up the point and fully investigate my suggestion. I might note that the females I have examined have appeared to be fully adult and that the ruddy coloration would appear to be permanent, and not a seasonal phase only.

I have figured two birds procured about the same locality showing the ruddy phase and the normal, and also the form from Melville Island, which is close to *P. phalaenoides*, but peculiarly enough no ruddy bird was obtained on the island, whilst specimens from Port Essington, etc., are in the British Museum, and the majority have a strong ruddy tendency, the only sexed bird being very red and a female.

Mr. Thos. P. Austin, of Cobbora, New South Wales, has written me: "I know of no bird which can hide itself better in a tree, simply by Nature's protection, than this species. On several occasions I have seen a bird perched on a thick limb, or even on a nest, and at no very great height from the ground, and after looking at it for some little time, was not sure then if it was a Frogmouth or a broken-off dead branch. Twice when I have been in such doubt, I have disturbed the bird by throwing a stick, and then found there were two of them perched quite close together on the same branch, one I had not noticed until it took wing. I am of the opinion that if disturbed while nesting they will remove either their eggs or young. In daylight they always appear to be very sleepy, lazy birds, and much prefer to escape notice by imitating a dead branch to taking wing, but if captured they convert themselves into a very different object. One came into my house one night, and when handled it at once changed into just the very reverse to what we usually see them, with eyes and mouth widely opened, it was just as savage as any bird could be, making a grunting sort of a noise during its struggles."

In the *Emu*, Vol. VII., p. 31, 1907, Mr. Austin had recorded: "The only Frogmouth of the four which I know of in these parts. Although it is a bird very seldom seen here, its peculiar notes may often be heard on a still night, especially a little after sunset. I only once found them breeding here; the nest was upon the thick bough of an apple tree. I could see one bird sitting on the nest, and it was not till I was within a few feet of it that I detected a second bird, not more than a foot from the nest. I think there must be a great number of these birds breed here."

Campbell quotes Le Souëf recording of the North Queensland bird: "Occasionally I have noticed the female resting close to the male as he sits on the nest, but as a rule they are on a neighbouring tree, and the report of a gun close by does not seem to disturb them much."

Berney writes from North Queensland (*Emu*, Vol. VI., p. 43, 1906): "Of the four *Caprimulgidæ* that I have been able to identify this is the one I see least;

TAWNY FROGMOUTH.

I have but few local notes concerning them. I found a nest (10th October) containing two white downy chicks, situated on a horizontal limb of a gidea tree. I only lifted one of the youngsters to examine it, yet on my way home in the evening I found the nest empty, and the old birds nowhere about, the chicks having been removed, I suppose, by the old birds, which were both at the nest in the morning."

Macgillivray, writing about North Queensland birds (*Emu*, Vol. XIII., p. 158, 1914), records: "*Podargus brachypterus*. Shortwinged Frogmouth. Several skins of a small *Podargus* were sent from the Gulf country by Mr. M'Lennan. They were referred to this species by Mr. A. J. North, to whom they were submitted. The species ranges over the whole of central, western, and north-western Australia, Northern Territory, and western and north-western Queensland. Irides are yellow, bill and legs light olive-brown. Stomach contained beetles and grasshoppers. Mr. M'Lennan heard a call which he attributed to this bird; it was like 'Koo loo, koo loo,' repeated from twelve to twenty times in succession."

"*Podargus phalaenoides*. Freckled Frogmouth. Skins of a small *Podargus* from the Jardine River, Cape York Peninsula, collected in open forest, were submitted to Mr. North, who is of opinion that they closely approach Gould's description of this species. Gould's specimens came from North-west Australia. Irides, outer circle golden-brown, inner orange-yellow; bill dark brown; legs pale olive. Stomach contained beetles. They were found frequenting the open forest country. Mr. Wheatley found several nests containing each a pair of eggs in the open country bordering the Batavia and Ducie rivers during the past season."

The Gulf form was that called by Masters *Podargus gouldi*, and the Cape York form is hereafter distinguished. It is, however, noteworthy that the conservative North separated these two forms.

Alex. W. Milligan, reporting on a trip to the Wongan Hills, West Australia (*Emu*, Vol. IV., p. 2, 1904), gives two plates, one of nest *in situ* and young of Frogmouth and the other of an adult beside nest, commenting: "We observed two nests, each containing two young ones. The first one was discovered in an isolated *Casuarina* belt on the lake country, and so closely did the nest and young resemble the surrounding branches that we should have passed within a yard of it had not the parent bird flown away and thus drawn our attention. The nest itself was an ill-constructed, shallow, flimsy structure, the builders having evidently relied to a great degree on the inclined fork and under twigs of the dead sapling for the strength of the structure. The second one was discovered by our driver in a York gum-tree, the main branches of which overhung the road. The nest was placed some 30 ft. high above the road.

THE BIRDS OF AUSTRALIA.

One of the attendant parent birds, on observing us, immediately elongated itself and became rigid along the length of the limb, and so resembled the surroundings as almost to defy detection. I have always been struck with the similarity of the habit of the bird in so elongating and stiffening itself to that of some of the iguanas, which perform the same acts when observed. Can it be a device to escape detection inherited from a common ancestor? . . . We could not help remarking the swift, straight, and prolonged flight that the owner of each nest made when disturbed. As these were flights made in the daytime it may be fairly assumed that the strong light of day does not materially affect their sight."

Whitlock, at the Pilbarra Goldfield, West Australia, recorded (*Emu*, Vol. VIII., p. 188, 1909): "Not uncommon on the upper Coongan, and several nests found. It appeared to me that these north-western individuals were paler and more uniform in plumage than those of the south-west. The nests I saw were generally in some isolated and stunted gum growing in the rocky and more secluded gullies."

Mr. Tom Carter has handed me the following valuable contribution: "*Podargus strigoides*. Frogmouth. *Mid-west* Aboriginal name *MORE-PORK*. This species is distributed over West Australia, from the south coast to the North-west Cape, from my own observations, and is fairly common about Kellerburin, which district is about the eastern limit of large timber in that part of the State. About Point Cloates and the North-west Cape, where timber is absent, these birds were to be found in the stunted trees growing in the gorges of the rugged ranges, but were not abundant. They are much more common in the timbered south-west and about Broome Hill. During my ten years' residence at the latter district, several Frogmouths were found hanging dead in the sheep-netting fences of my station there, at various times. Their large heads had passed through the four-inch meshes of the netting apparently during a night flight, and the birds, being unable to extricate themselves, had died there. This species usually spends the day in sleeping in the shelter of dense foliage, such as she-oaks or a bunch of 'suckers,' and the male and female birds (except at the breeding-season) often perch so, side by side, rarely very far apart. In such cases, especially when the birds are within reach from the ground, it is possible, by approaching very quietly, to catch one of them with one's hands, as I have done occasionally. When I was in Tasmania, in 1909, a pair of birds were noted sitting side by side on a bare horizontal branch about 10 a.m., fully exposed to the sun, but they *might* have been previously disturbed from their original resting-place. It is also quite a common occurrence for these birds to sleep on the ground at the foot of a tree, or under the shade of a bush. I have often seen them do this about Albany. When

TAWNY FROGMOUTH.

disturbed from sleep the birds, as a rule, do not fly very far. The colouring of this species varies very much in all localities (according to my experience) from a rich rufous shade on parts, or the whole, of the mantle and underparts, to a deep blackish-grey, and seems to be irrespective of sex. The general nature of the plumage is distinctly protective, of which these birds seem to be aware, as well as other species. Thus, while walking through one of my Broome Hill paddocks, my attention was attracted by what seemed to be a strip of dry bark hanging up in the small upper branches (which are usually covered with quite *smooth green* bark) of a York gum-tree. As fallen bark is not usually seen in such a place, but always occurs on *lower limbs*, I used my binoculars and found that the object was a fine Tawny Frogmouth, holding itself in a strained position, with feathers compressed and the body (apparently) very much elongated. Most probably the bird had previously been disturbed by me in the course of my walk, and had, unnoticed by me, alighted in the tree, and taken up this attitude at my approach, but had chosen a bad position for its pose. Respecting the much-argued point as to whether *Ninox boobook* or *Podargus* utters the *More-pork* call, I cannot say definitely, but feel sure that besides the 'Oom, oom' call of the Frogmouth, it has another, which can only be described as 'More-pork,' whereas the Owl's cry more resembles Boo-book or Boo-buk. Distance and atmospheric conditions, it is well known, modulate sounds. In favour of this argument I may state that while residing at Point Cloates two Queenslanders were engaged by me to sink a well at a spot about thirty miles inland, where I had discovered a nice creek fringed with some white gum-trees, Casuarina, etc. About a fortnight afterwards I rode out to see how the work was progressing, and at the men's camp noticed a fine specimen (dead) of *Podargus*. Upon enquiring how the bird came to be there, one of the men said that for many nights a —— More Pork used to come to the camp and disturb the sleep of his mate and himself by its —— Morepork, so the previous night (there being a good moon) he had sat up with his gun and shot the bird as it perched, uttering its cry, on its usual place, the windlass over the well-shaft: Knowing I collected birds he had kept the specimen, expecting me to visit their work. As I knew that the body would not keep until I returned home, I thereupon skinned it, and opening out its gizzard found it crammed full with large centipedes, to eat which was no doubt the reason of the bird visiting the camp, as centipedes are always disturbed in numbers and brought to the surface at such work as well-sinking. When residing at Broome Hill, on many moonlight nights I went out with my gun in order to try and shoot the bird uttering More-Pork, but never succeeded in doing so, although several times the bird was uttering its cry in a tree (always high up among the green leaves) over my head, and when it *did* fly away, it was either from the further side of the tree,

THE BIRDS OF AUSTRALIA.

so that its departure was unseen, or else so hurriedly on my side that my snapshot was without result. I noticed that the 'More Pork' was uttered in a very leisurely manner at first, with an interval of four or five seconds after each call, but after a few minutes the interval became rapidly less until the 'More Pork' became continuous and more guttural, gradually merging into 'Morr-porrk-M-porrk, M-porrk, M-porrk-porrk-porrk-porrk-urrk-urrk,' and then a sudden silence, the bird having flown away. The last few notes much resembled a very rapid hoarse croaking by a frog, and could not be heard at any distance. Sometimes several months would pass without hearing a call at Broome Hill, and then a bird or birds would be heard almost every night for some weeks. About Point Cloates this species appeared to breed any time after rains. Thus on October 30, 1900, I drove in my buggy forty miles inland right under one of their slight nests, containing two eggs, built about ten feet from the ground in a small Black Heart (sp. Mallee?). As usual, the bird sat in upright position, with tip of beak pointing upwards. Its eyes were wide open and intently watching me. It was a male bird. Other eggs were noted July 16, 1901, February 7, 1902, and a fledgling on December 4, 1900. The nest is usually from six to ten feet from the ground. About Broome Hill there seems to be a regular breeding-season, commencing in September and continuing through October. On Nov. 4, 1906, noted small fledgling (pale grey). Nov. 2, 1908. Fledgling young (two), can just fly. Light grey plumage. Irides *reddish-hazel*. Oct. 9, 1910. Two eggs (usual clutch). Nov. 3, 1910. Fledged bird seen. Nov. 29, 1911. Newly fledged young. Sept. 26, 1912. *Very small* young in white down, fallen out of nest; this small bird contained some grasshoppers and two centipedes, one *four* inches, the other $3\frac{1}{2}$ inches in length. Oct. 25, 1912. Noted two young in nest, about a week old. Centipedes appear to be the main food, and also beetles, spiders and grasshoppers. A neighbour's wife told me she knew a nest that had been laid in every year for seven years, although her boys took the eggs or young from it every year."

Mr. J. P. Rogers noted at Melville Island: "Cooper's Camp, Oct. 28, 1911. Three were seen to-day. Nov. 3, 1911. Another party of three were noted. Both these had young birds with them. Nov. 5, 1911. A single bird seen. Dec. 15, 1911. This species is now fairly numerous. Jan. 14, 1912. None were seen at the north side of the island. Jan. 31, 1912, Cooper's Camp. A party seen again."

I hereafter give some notes on the call of this bird, but will first comment upon the breeding habits. It will be noticed that Gould found one male sitting, though, apparently, generally females undertook that act. Recent recorders sometimes conclude that the male only officiates, while others suggest the female alone. It seems important that such items should be considered, as it may

TAWNY FROGMOUTH.

be that the different subspecies have different habits and that consequently all the observers are right. At the present time all the reports are quite contradictory and I think it will be proved that there is variation in their habits according to localities. It would be unwise, however, to conclude too hastily that such is the case, as in the Mallee subspecies the nest-building habit that instigated the investigation of the form (in connection with the small size of the eggs) was not confirmed by further observations, but rather the reverse. Nevertheless, such items are always worthy of record, as they very often suggest solutions which might otherwise be overlooked.

The Frogmouth has been credited with the call "Mopoke," and therefore in the *Emu* (Vol. X., p. 246, 1910) Mattingley gave his experience with a tame bird. I incorporate his account: "Some time ago a gentleman remarked to me that he had a *Podargus* (*P. strigoides*) which had the feathers of one wing cut off. He intended to destroy it because he had grown tired of feeding it, and on account of the bird not being able to fly away when liberated. Desiring to save the life of the interesting nocturnal bird, I obtained it, and released it in my garden at Kew, Victoria. I resolved to feed it until it could fly away and hunt for itself. The bird gradually became fairly tame, and readily took pieces of meat from my hand. Any stray mice that I captured it ate ravenously. In course of time it started its hooting call during the night, and occasionally a wild mate, attracted by its nocturne, would make its appearance. These birds became so accustomed to my proximity to them that they allowed me to get within a few feet of them whilst they were calling. I was enabled thereby to observe how the *Podargus*' hooting note was produced. With its head elevated at an angle of about 30 degrees, with its bill fully closed, and with throat distended, the bird pulsates its throat, giving forth a rapid vibrating note, sounding at a distance like 'Oom-oom-oom-oom-oom,' but when close to the bird the call of a single 'oom' or hoot I found consists of two notes produced not unlike "Too-roo, too-roo, too-roo," emitted in an almost continuous delivery, ranging from 14 'ooms' or hoots to 158 'ooms' without cessation. From lengthy observations I was able to ascertain that the greatest number of notes was produced on moonlight nights, especially about eleven o'clock. Sometimes the bird uttered a few hoots during the daytime. This occurred more often about 6 p.m. On several occasions I timed the duration of the calls, and found them uttered at about six 'ooms' (calls) to the second. As a rule, there is the succession of calls uttered by the bird, ranging from two seconds' to about twenty-seven seconds' duration. The whole series of calls were emitted during the space of about three minutes. Generally, the *Podargus* started its call in subdued tones, the full volume of sound being reached after a few hoots. The subdued

THE BIRDS OF AUSTRALIA.

tones had a ventriloquial effect. For many years past I have taken notice of the *Podargus* in their home in the bush, but I have never yet heard them utter the familiar call of 'Mopoke,' which note some persons attribute to this bird, although I have made special efforts to ascertain the truth of their statements."

In the *Emu* (Vol. XIII., p. 215, 1914) Miss Muriel Cheney, of Carraragarmungee, Victoria, wrote: "For several months past I have heard at night a peculiar metallic call. It appeared to come from the creek, about a mile away, and was never heard earlier than 10 p.m. or 11 p.m. A few days ago I was watching a pair of Tawny Frogmouths (*Podargus strigoides*) flying about our garden, a little after sunset. Occasionally they uttered the call 'Oom, oom,' as if communicating something of importance to one another, especially after a sudden swoop on the part of either. A little later a Boobook Owl (*Ninox boobook*), a frequent visitor, fluttered into one of the pine trees and began its leisurely solitary call. Early in the morning I awoke, and hearing this metallic call, determined, if possible, to find the author thereof. It should be noted that the Boobook Owl continued its note during the time of which I am writing. Going out into the garden, I at first found it very difficult to locate the bird (presumably) for which I was looking. At times the cry appeared to come from the east, then from the north, and always from far away. Thinking it best to start the search from home, I stood first under one tree, then another, until, coming to an old, partially leafless eucalypt outside the school fence, I distinctly heard, above my head, the sounds 'More pork, more pork,' uttered very rapidly from seven to ten times in succession, with a pause of a minute or two before the next series of calls. I could not discern the bird, but it happened to fly down to a low branch, and, being between me and the setting moon, I could see it plainly—in fact, I could have touched it. It was a Frogmouth. For about twenty minutes I stood watching and listening, comparing the two calls as they happened to be uttered together. Then I followed the Frogmouth from tree to tree until it went to a distant paddock where I could not follow. As a result of my observations I would say, firstly, that the Frogmouth does call 'Morepork,' and, secondly, that no one who has heard the Boobook Owl's and the Frogmouth's calls could ever mistake one for the other. I will indicate what I consider to be the chief points of dissimilarity: The Boobook Owl has a leisurely call, the Frogmouth a quick call; the Boobook utters one call at a time, the Frogmouth from seven to ten calls in succession; the Owl makes a slight pause between the two syllables 'Boo-book,' the Frogmouth makes no appreciable pause between the two syllables; the Owl has the distinct vowel sound 'oo,' whereas *P. strigoides* utters the 'aw' in a guttural manner, not

TAWNY FROGMOUTH.

nasal. Heard at close range, it sounds like a hoarse whisper; at a little distance it sounds metallic. Constable Montgomery, of Eldorado, was able to confirm my observations. He has seen and heard the Frogmouth many times."

In the next volume (p. 206) the differences in the calls are given in the musical scale, but no further comment was made, a note reading: "The remarkable faculty this bird possesses of hiding itself was well seen one day when we observed one flying about. Being very weak-footed, and dazed by the light, it was unable to perch, thus falling to the ground. After searching for a few minutes, we found it, apparently dead, with wings outstretched and head flat on the ground. It took no notice of the sundry liftings and straightenings we gave it. Picking it up, we started to carry it home. On the way it suddenly opened its beak and turned round with wide-open eyes. Its bearer dropped it in fear. Again it lay as though dead. I thought I would take a photograph of it as it was. Without a sound it had gone. About twenty minutes' vigorous search ensued, and it was not found until a boy went to pick up a piece of bark (as he thought); but it defied all efforts at photography."

Although Miss Cheney's account had been so detailed and apparently so accurate and convincing, Mr. J. W. Mellor wrote in the *Emu* (Vol. XV., p. 53, 1915), contending "that the 'More Pork' notes are uttered by the Boobook Owl, and that the Frogmouth does not use this 'call.'"

Two pages further (p. 55), not at all in any connection with this controversy, the opinion of Mr. Martin W. Elliott, of Dumbleyung, near Wagen, West Australia, appeared: "The Boobook Owl may say 'More Pork,' but to say that the Frogmouth *does not* is quite incorrect. I have heard it give the cry scores of times."

From the preceding observations the only unprejudiced conclusion must be that this bird does make a cry which can be roughly translated by the words "Morepork" or "Boobook." Thus the fact that the aborigines gave its name to the very early settlers as "Poo-book," as recorded by Latham in 1801, is a very strong item, while Gould noted that the Tasmanian colonists called it "More Pork," and further emphasised the value of this information by noting that, at that time, it was a familiar common bird and made the call when seated on the verandahs of the houses of the settlers. I would consider Miss Cheney's explanation accurate and convincing, viz. that the two calls are dissimilar in sound and utterance, though separately both would give the human mind a similar idea of "Morepork" or "Boobook." It may be, as in the case of the incubating birds just above noted, that the call varies according to locality and that while the Tasmanian and Victorian form (for

THE BIRDS OF AUSTRALIA.

instance) may commonly call "More Pork," it may be a very rare occurrence for the South Australian form to give that call. Such an explanation would fulfil the records and, moreover, be quite a natural result of subspecific differentiation.

The first note of this species is when Latham proposed three new species of Goatsuckers: the Strigoid, the Great-headed and the Gracile, all from New South Wales. These were introduced in the *Second Supplement of the General Synopsis of Birds*, published in 1801, and Latin names corresponding to the vernaculars given were added in the *Supplement to the Index Ornithologicus*, simultaneously published. The source of information was not given by Latham, so that it was not until over one hundred years afterwards that it became known that Latham's descriptions were based on pictures. In the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., Sharpe elucidated the set of paintings known as the Watling drawings and there simply noted (p. 145):—

"No 220. Strigoid Goatsucker Lath., etc.

[This drawing is the type of Latham's description of the Strigoid Goatsucker.]

No. 221. Great-headed Goatsucker Lath., etc.

No. 222. Gracile Goatsucker Lath., etc."

No discussion was given nor attempt to account for the non-recognition that the three pictures represented the same species. I have re-examined those pictures and conclude that the three were drawn by different artists who each emphasised the coloration which attracted him, but they do not seem to have been drawn from the same specimens. No reference was made to the fact that G. R. Gray, Strickland and Gould had studied these drawings and reported upon them sixty odd years before and that it was due to the sight of these that Latham's specific name *strigoides* came into use. When specimens were received in the succeeding twenty years they were never contrasted with the drawings: this was probably due to Latham's old age and, without due consideration by others, his conclusions were accepted, though it should have been remembered that names for similar birds were in existence.

A further complication was introduced by Vigors and Horsfield in their famous essay on the Australian Birds in the Collection of the Linnean Society. Ignoring the Lathamian names given twenty-odd years before, they described the specimens before them. As Latham himself in his extreme old age had not recognised the specimens as agreeing with the pictures he had worked over twenty years previously, they accepted his latter determination. They noted that Latham had proposed some new names and that with his concurrence they made use of them. They thus proposed *Podargus stanleyanus* for the bird presented by Lord Stanley and which had been described by Latham under

TAWNY FROGMOUTH.

the English name of Wedge-tailed Goatsucker. Then followed a *Podargus humeralis* with a long note of explanation. "The birds of this genus in the Society's collection bear such a general resemblance to each other that we have felt some hesitation in describing them as different species. The careful examination of many individuals in their own country will alone determine with certainty whether they are distinct, or merely varieties of the same species from age or sex. With respect to the two foregoing species we have to observe that Dr. Latham, by the examination of other subjects, has been led to the same result as we have been by the comparison of the specimens in our collection; and has described these birds respectively as the *Wedge-tailed* and *Cold River Goatsuckers*. The chief differences between them are as follows: The *Pod. stanleyanus* is somewhat larger than the *Pod. humeralis*; the colour of its plumage is more purely cinereous and brown, being almost without any mixture of tawny; the external marks are more delicate, and the gape of the bill is wider. The *Pod. humeralis* is distinguished by bold black longitudinal streaks, some of which are of considerable breadth, which mark the upper parts; by white dots or bands at or near the extreme points of the plumes of the head, forehead, neck, back, and adjoining parts of the wings; by a decided admixture of tawny among its colours; and by two strongly marked fulvous bands which cross the coverts of the wings. On the underside the transverse bands of the plumes, meeting the longitudinal streaks along the shafts at right angles, afford a somewhat regularly chequered marking, which appears peculiar to this latter bird."

Then they added *Podargus cuvieri*, writing: "This bird also exhibits so general a resemblance to the preceding species that we should at once have referred to it as a variety, were it not that it differs in its geographical situation as well as in some minuter characters. It is a native of Van Diemen's Land, where it was met with by Mr. Caley, while the other species is found in New South Wales. That gentleman noted also that the *irides* of the present bird were brown, while those of *Pod. humeralis* were yellow. The chief difference in their plumage is as follows: The longitudinal streaks on the head of *Pod. humeralis* are bold and broad, diffusing a strong black shade over the head; those of *Pod. cuvieri* are slender and more distant from each other, and leave the fuscous-brown of the head predominant. The *Pod. cuvieri* wants the fulvous *fascia* on the shoulder, and the *fasciæ* on the tail are not so strongly marked as in *Pod. humeralis*. The bill also of the Van Diemen's Land bird is somewhat shorter than the bill of the other. We have seen a few other specimens of *Pod. cuvieri* which came from the same locality as our specimen; as also some other birds of the New South Wales species; and those leading marks of distinction stated above seemed constant

THE BIRDS OF AUSTRALIA.

between them. At the same time, we must observe that there appeared much variation in the different specimens of each of these supposed species; and we consequently cannot speak with the same certainty respecting the difference of species in this group, as in groups less subject to variation. We therefore state our doubts on these points, while we follow the general plan which we have prescribed for ourselves in all such doubtful cases, of keeping apparent species distinct, until proof is given of their being identical. Mr. Caley calls all these birds by the native name of *Benit*! He observes that they are night birds, and seem stupefied when found upon the wing by day."

Gould met with the birds when in Australia, but this did not help him much; however, on his return, upon geographical grounds, he separated two new species: the first from Port Essington, on account of its smaller size and pale, delicate coloration, and the second from South-west Australia on account of its smaller size and similar coloration to the eastern bird. He was not satisfied, however, about the species and forms and wrote therefore in the Introduction to the *Birds of Australia*: "With no one group of the Australian birds have I had so much difficulty in discriminating the species as the genus *Podargus*. It is almost impossible to determine with certainty the older species described by Latham; could this have been done satisfactorily, even in a single instance, it would have greatly facilitated the investigation of the remainder. Messrs. Vigors and Horsfield regarded the specimens in the Linnæan Collection as referable to three species, and have described them under the names of *stanleyanus*, *humeralis*, and *cuvieri*; Latham's description of the species named by him *megacephalus* accords so well with the *P. stanleyanus* that I suspect both these terms have been applied to one and the same species, an opinion strengthened by Latham's remarks as to the great size of the head and mandibles of his bird, the total length of which he states to be thirty inches, which is evidently an error. After examining a large number of specimens, comprising individuals of all ages, I have come to the conclusion that the Australian members of this genus constitute six species; four of which, namely, *P. megacephalus*, *P. humeralis*, *P. cuvieri* and *P. brachypterus*, are most closely allied to each other; and two, namely, *P. plumiferus* and *P. phalænoides*, which present specific characters that cannot be mistaken . . . So great a similarity in plumage reigns throughout the first four of the species enumerated below that I have thought it unnecessary to figure more than two, viz. *P. humeralis* and *P. cuvieri*; the other two may be readily distinguished by the descriptions I have given of them, particularly if the localities be attended to." Under *P. megacephalus* Gould observed: "In the general colouring, form and arrangement of its markings, this species so closely resembles the *P. humeralis* that one description applies equally to

TAWNY FROGMOUTH.

both ; but it may be distinguished by its being somewhat larger in the body, and much larger in the head, and by the very great development of the mandibles. It inhabits the brushes of the east coast, and in its habits and economy resembles the other species of the group." Of *P. brachypterus* he wrote: "In its general appearance this bird closely resembles the *P. humeralis*, but is even smaller in size than *P. cuvieri*, while at the same time the bill is larger than that of the former species, and projects much farther from the face than in any other of its congeners ; it also differs in the shortness of its wings, which circumstance suggested the specific appellation I have assigned to it. It is a native of Western Australia." Of *Podargus cuvieri* Gould had concluded: "This species is readily distinguished from the *Podargus humeralis* by the bill being much less robust and of a more adpressed form, while the culmen is sharp and elevated ; the bird itself is also of a smaller size and altogether more slender than its near ally. Tasmania, if not its exclusive habitat, is certainly its great stronghold."

Later, regarding *P. megacephalus*, he commented: "I believe I have good grounds for regarding the *Podargus megacephalus* as distinct from *P. humeralis* . . . but I must admit that the question is an open one."

It should be emphasised that Gould's species, with the exception of this doubtful one, were geographical representatives, as he was careful to indicate and also lay stress upon. Gould was probably one of the first to deliberately emphasise the importance of geographical range in the differentiation of closely allied forms, which he termed species, but which we now rank as subspecies only.

In the *Catalogue of the Birds in the British Museum*, Vol. XVI., 1892, Hartert monographed the *Podargidæ*, and there distinguished two species, *Podargus strigoides* with "*Hab.*, the greater part of Australia, and Tasmania," and *Podargus phalænoides* with "*Hab.*, northern and western parts of Australia." At this time subspecies were being conservatively recognised after a lapse of ten years, and Hartert relegated some so-called species to the lower rank, but in this case the matter was too difficult of easy determination. Thus he described the Adult of the first named, and then explained: "The female seems to be similar to the male in colour, but the few specimens examined by me are not conclusive. The description is that of a typical large specimen in the ordinary coloration. The species, however, varies considerably in colour, many specimens being much lighter, others much darker, others, again, more rufous. The variations in size are still great. The smaller specimens have been distinguished under the name of *Podargus cuvieri*. The measurements of the smallest specimens are: Wing 9·3 to 9·8 inches, tail 7·3 to 7·8, tarsus 1·3, bill from gape to tip 2·5, width of gape 2.

THE BIRDS OF AUSTRALIA.

"Many intermediate specimens, however, form a complete link from the large to the small form, and the smaller form seems *not* to be confined to the southern parts of Australia, nor the larger form to the northern parts. These slight differences might in other families of birds be reckoned as specific characters, but they seem to be of little value in the genus *Podargus*. I therefore come to the conclusion that all these varieties belong to one species. It must be left to Australian field-ornithologists to study all these forms carefully. Should further investigations prove that I am wrong in uniting them, I still maintain that the smaller form is merely a subspecies, and at present I do not even admit that it is worthy of this recognition."

In connection with the "species" *Podargus phalænoides* was written: "This species is easily distinguished from *P. strigoides* by its beautiful delicate coloration and smaller size. The contrast between the yellow bill of *P. phalænoides* and the bluish-black bill of *P. cuvieri* in Gould's beautiful plates (*l.c.*), however, seems to be exaggerated." As a footnote Hartert added: "*Podargus brachypterus* . . . seems to belong to *P. phalænoides*, but Gould appears to have also included under this name small specimens of *P. strigoides*. Gould's *P. macrorhynchus* is probably also referable to *P. phalænoides*."

Under *P. strigoides* Hartert catalogued a specimen from N.W. Australia *ex* Capt. Bowyer Bower, its companion being referred to *P. phalænoides*. In the same way specimens from Rockingham Bay were separated into the two species. When he received a collection from North-west Australia, some years later, he reviewed the forms, concluding (*Nov. Zool.*, Vol. XII., p. 216) under the name *Podargus phalænoides*: "I do not at all consider the question of the various Australian forms of *Podargus* quite satisfactorily settled, but it seems to me that the *Podargus strigoides*, which inhabits the greater part of Queensland, New South Wales, Victoria, South Australia and Tasmania (from where I have no examples before me), is represented in western and northern Australia, eastwards to North Queensland, by a generally smaller and lighter, more delicately marked subspecies, *Podargus phalænoides* of Gould, though sometimes individuals cannot easily be distinguished, and some are quite intermediate. . . . I believe . . . the following forms (might be recognised):—

"*Podargus strigoides strigoides* : roughly speaking, the eastern portion of Australia. There is every possible intergradation between the various aberrations, only *phalænoides* being more or less separated and having another distribution.

"*Podargus strigoides phalænoides* : a western and northern form of *strigoides*."

This conclusion agrees better than the preceding with the facts . . . Following Hartert in the *Catalogue of the Birds in the British Museum*, Campbell, in his *Nests and Eggs*, only admitted *Podargus strigoides* and

TAWNY FROGMOUTH.

P. phalænoides, citing *P. brachypterus* as a synonym, but reserving, in a footnote, "I am not yet prepared to admit that *P. brachypterus* and *P. phalænoides* are really identical." In the range of the latter was included South (Central) Australia.

When North prepared the *Austr. Mus. Spec. Cat.*, No. 1, with a perversity that has been recently pointed out he included *Podargus strigoides* and *P. brachypterus*, with no mention of any other race or species. In connection with the former species he gave a résumé of the history of the name *strigoides* and commented upon the variation of the coloration. He indicated the fact that typical specimens were generally *not* tawny. He did not mention that *brachypterus* might be a subspecies, but regarded it as a species smaller than *strigoides*. He also regarded the South and Central Australian birds as referable to the smaller species. It would have been interesting to have had North's opinion regarding the northern birds, as Masters had named one form *gouldi*, from the Gulf of Carpentaria, and this had been reported from North-west Australia by Ramsay, while the Museum would certainly have available for comparison typical specimens of *phalænoides* and also North Queensland birds. No other Australian worker was in so favoured a position, yet advantage was not taken of it, a matter much to be regretted.

In the following account of my own conclusions I wish it to be always borne in mind that these are the results of examination of birds quite unprejudiced by the work of others, and it is interesting to note that in nearly every case I am in agreement with previous conclusions, arrived at by the examination of different material and often by different methods.

When I prepared my "Reference List" to the Birds of Australia published in January, 1912 (*Nov. Zool.* Vol. XVIII.), I reviewed the series I had brought together in accordance with subspecific considerations then accepted by British and American ornithologists. There could be no doubt that *P. phalænoides* could only be regarded as a subspecies, while many marked subspecies were recognisable and I admitted ten races as follows:—

Podargus strigoides strigoides (Latham). New South Wales.

Podargus strigoides cornwalli.

Differs from *P. s. strigoides* in its very much paler coloration and smaller size; wing 266-8 mm.; typical birds from New South Wales, wing 285-9 mm. Type: Mackay, Queensland.

Queensland.

Podargus strigoides victoriæ.

Differs from *P. s. strigoides* in its larger size; wing 292-300 mm.; typical birds from New South Wales, wing 285-9 mm. Type: Victoria.

Victoria.

THE BIRDS OF AUSTRALIA.

Podargus strigoides cuvieri Vigors and Horsfield. Tasmania.

Podargus strigoides rossi.

Differ from *P. s. strigoides* in its darker (blackish) coloration and its smaller size : wing 255 mm. ; average wing 252-6 mm. Type : South Australia.

North-west Victoria, South Australia.

Podargus strigoides brachypterus Gould. West Australia.

P. macrorhynchus was proposed by Gould simultaneously as an alternative.

Podargus strigoides phalænoides (Gould). Northern Territory.

Podargus strigoides mungi.

Differs from *P. s. phalænoides* in its darker coloration. Type : Mungi, North-west Australia.

Interior of North-west Australia.

Podargus strigoides dendyi.

Differs from *P. s. phalænoides* in its smaller size : wing 218-25 mm. (wing of *phalænoides* 233 mm.). Type : Derby, N.W.A.

North-west Australia (coast).

Podargus strigoides gouldi (Masters). North Queensland.

The acquisition of good material from Melville Island enabled me to separate as new (*Austral Av. Rec.*, Vol. I., p. 37, April 2, 1912)—

Podargus strigoides melvillensis.

Differs from *P. s. phalænoides* in its much smaller size ; wing 203 mm. Melville Island.

For my "Reference List" I again criticised my augmented series and maintained ten subspecies, conservatively attaching *P. s. dendyi* as a synonym of *P. s. mungi*. I have once again carefully studied the species, and I now maintain that even more subspecies are recognisable and that the birds are sedentary and very local. This fact was proven by the Victorian naturalists who investigated the birds of the Mallee country and who pointed out that the form found in the Mallee constantly laid a smaller egg and was constantly smaller, with other minor differences. When series are examined the subspecies are easily seen, and though this species is variable in coloration the series are distinctly separable.

It may be pointed out that two distinct groups are very noticeable, the *strigoides* (typical) group, which ranges from South Queensland through New South Wales, Victoria, Tasmania, South and South-west Australia, and the *phalænoides* group which occupies the remainder of the northern continent. The latter group is the distinct smaller, more delicately marked form which was long regarded as a distinct species. However, intermediates occur among

TAWNY FROGMOUTH.

the northern birds somewhat closely approaching the southern specimens, but I have never seen a light southern specimen comparable with the normal Northern bird.

There appears to be no difference, that can be determined, between adult male, female and immature. Hence, as young birds of the year are shorter in the wing, the species seems to show a large amount of variation in this respect. As a matter of fact, were it possible to determine adults exactly I believe little variation would be observed. Thus in one series I note 10 millimetres covers the variation and in another 7 millimetres in the same number of birds. Therefore, when a difference of 40 millimetres is recorded the conclusion seems to be that the shortwinged specimens are immature. As, however, there seems to be a practice among American and European ornithologists of measuring every bird and averaging these, a method, which does not seem scientific to me, I have tested these series by both methods, and the results are unchanged. The differences in the various subspecies are not very large, but these are constant and, moreover, three groups with a great difference in size can be recognised: thus *strigoides* typical may average over 280 mm. in the wing, Tasmanian birds never quite reaching that figure, but these may be included; from the Mallee of Victoria to South-west Australia a form averaging about 250 mm. occurs, and in the north a much less form, varying about 220, is the rule: hence Gould's three "*species*," *strigoides*, *brachypterus* and *phalænoides*.

The New South Wales birds, which are typical, are of large size (at the Richmond River very dark, which may constitute another subspecies), of brownish coloration, hence the name "tawny," but quite variable in tone: a beautiful rufescent phase here occurs in which the coloration is all rufous: the specimens examined have all been females, but all females are not rufescent, nor are the young of that colour, so that the red phase seems a pure aberration, but it is peculiar it should be confined to females. As a rule the females are inclined to be tawny birds, but this is not a constant feature. In measurements the males very slightly exceed the females, the averages reading ♂ mm. 278 in wing: ♀ mm. 272 in wing, the largest specimen being a male with wing 290 mm. These bear the name

Podargus strigoides strigoides (Latham),

and the range, as far as is yet known, is only New South Wales.

It may be when the distribution of Australian birds is geographically accurately worked out that, as with many other birds, the northern Victorian specimens will be referable to the above form while the southern Victorian ones may differ. At the present time I class all the Victorian birds as a slightly larger subspecies, as the average is slightly larger and a third of the birds

THE BIRDS OF AUSTRALIA.

examined are absolutely larger in the wing than the largest New South Wales specimen. This may be maintained as a subspecies

Podargus strigoides victoriae Mathews. Victoria.

It must be remembered that the Mallee of Victoria harbours a distinctly smaller bird, as will be noted below. In coloration Tasmanian birds are noticeably darker above and below, with the throat peculiarly more grey. As the size is smaller this is a valid subspecies: the males average 270 mm. in the wing, females little less, and the largest wing is 279 mm. Vigors and Horsfield give detailed differences in the coloration which are approximately correct, and the name to be used is

Podargus strigoides cuvieri Vigors and Horsfield. Tasmania.

The preceding three subspecies grade easily and are little differentiated, so that it was surprising when the Victorian ornithologists pointed out that the *Podargus* of the Mallee of Victoria and South Australia adjoining was a distinct and much smaller bird. Of this fact there can be no denial, as the largest specimen, the type of *rossi*, only measures (a male) 256 mm. in the wing and the average of the males is 254, the wing measurement being peculiarly constant: the females so far procured are noticeably less, only averaging 241 mm. in the wing, while as regards coloration the specimens are darker than *P. s. victoriae*. Hence as a very marked subspecies leading to another group we have

Podargus strigoides rossi Mathews. Mallee of Victoria and South Australia.

Captain White's expeditions to the Gawler Ranges, Eyre Peninsula and Central Australia. have furnished a series which must receive a subspecific name as they are noticeably lighter than the preceding birds and are, moreover, slightly smaller. The largest male measures 248 mm. in the wing, and the average wing measurement of males is 243 mm., of females 240 mm. I therefore name the Central Australian form

Podargus strigoides centralia nov. subsp.

The type is a female from Apperinna Bore, Central Australia, collected on August 8th, 1913, by Captain Samuel A. White.

Gould named the West Australian bird as a distinct species on account of its smaller wing measurement, and this is a constant feature, though of only subspecific value. The measurements agree very closely with those of the Mallee form, the averages being exactly the same, but they are characteristically lighter in coloration and the females show a rufescent tinge as a constant feature.

The name for this form will be

Podargus strigoides brachypterus Gould. South-west Australia.

TAWNY FROGMOUTH.

These last three are very close to each other and agree nearly in size but vary in coloration.

The northern forms are quite as complex, but so much smaller that they scarcely grade in size, and their coloration is also much paler and the markings more delicate.

The birds from Mackay, South Queensland, are, however, very peculiar in that they show features of both northern and southern birds without being alike to either. They are smaller than typical *strigoides* but approach them in size, with a wing measurement averaging 268 mm. In coloration they show the fine markings and pale coloration of the northern ones, but these are washed with bold black markings and the mantle is beautifully tawny. Wherever they are placed they stand out so that they must be subspecifically separated.

The name is

Podargus strigoides cornwalli Mathews. Mackay, Queensland.

The remainder of the northern birds agree very closely in coloration but can be separated by measurement into six subspecies. This may appear to be subdividing too much, but I have found that a series in this species shows the validity of subspecies that few birds only suggest. I suppressed the Mungi form which I here reinstate, as the access of material indicates that it is a distinct form.

I propose

Podargus strigoides capensis subsp. n. Cape York Peninsula.

The type is a male collected by W. R. M'Lennan at Jardine Creek, Cape York, on April 29th, 1911.

All the birds from this locality are smaller than those from more southern localities, the wing measurement of males being 211 millimetres, the largest measuring 217 mm.

The birds from Cairns, Normanton, Alexandra, etc., I class together under the name

Podargus strigoides gouldi Masters.

The wing measurement averages 225 mm., the least wing measurement being 222 and the largest 233 mm. Its range is the Cairns district of Queensland and the Gulf of Carpentaria adjacent. It is possible that longer series will enable the separation of the Cairns form from the inland one. The coloration varies, but not sufficiently to determine the subspecies with the birds at hand.

The Melville Island subspecies,

Podargus strigoides melvillensis Mathews,

is a small form, averaging the same as the Cape York birds, and not a great

THE BIRDS OF AUSTRALIA.

deal different in coloration. It is a little lighter on the average, and the females generally show a rusty tinge on their backs.

The mainland birds,

Podargus strigoides phalænoides Gould,

are darker and larger, and maybe red females are more common at Port Essington: at any rate, three birds out of four in the British Museum show that feature. The wing measurement of the males is 232 millimetres.

The Mungi form,

Podargus strigoides mungi Mathews,

is here maintained, as it is larger and darker than the birds from the North-west Coast, the male wing measurement being 233 millimetres.

Of a good series of

Podargus strigoides dendyi Mathews,

the largest wing in the male only gives 223 millimetres, the average being 220 mm. These are paler even than the Melville Island form, but no rustiness is shown in the females.

The synonymy of the subspecies mainly centres round the typical form, which has ten names applicable, viz. *Caprimulgus strigoides* Latham, *C. megacephalus* Latham, *C. gracilis* Latham, *Podargus cinereus* Vieillot, *Caprimulgus podargus* Dumont, *Podargus australis* Stephens, *P. humeralis* and *P. stanleyanus* Vigors and Horsfield, *Podargus gigas* Nitzsch and *Caprimulgus crassirostris* Pelzeln. When Gould introduced *Podargus brachypterus* he proposed *macrorhynchus* as an equivalent and alternative name. Hartert observed that these might refer to similar birds whereas they were given to the same thing! At the same place (*Catalogue of the Birds in the British Museum*, Vol. XVI., pl. 634, footnote, 1892) he noted: "Cf. also *P. vincendoni* Hombr. and Jacq. *Voy. Pôle Sud*, pl. 21, fig. 1 (1846)." This appears to be the only consideration of this name, and I have not previously seen any disposal of it.

In the *Atlas Voy. Pôle Sud*, Oiseaux, pl. 21, fig. 1 A, a beautiful figure is given of the "Podarge de Vincendon (Nob)." No Latin name is given. In the text to the *Voy. Pôle Sud Zool.*, Vol. III., published in 1853, p. 92, *Podargus vincendonii* is fully described by Jacquinet and Pucheran as of Hombron and Jacquinet MS. The observations read: "Cette espèce est originaire de Borneo. Par sa coloration, elle a des rapports intimes avec le *Podargus humeralis* Vig. et Horsf., récemment figuré par M. Gould; mais elle s'en distingue par une taille moindre et par la plus grande longueur de ses ailes." Nothing like this figure is known from Borneo, and a specimen of *Podargus phalænoides* Gould in the British Museum agrees very closely in detail and shade of coloration with the plate cited. I have no hesitation in deciding that the bird figured was obtained at Raffles Bay, North Australia, and that the locality Borneo is quite erroneous.

TAWNY FROGMOUTH.

The Expedition procured birds at that locality and some locality labels were displaced, and the only possible conclusion is that this is one of the cases. It may be recorded that the accurate G. R. Gray questionably placed the name as a synonym of *phalænoides* because he was not certain whether any form occurred in Borneo or not.

The extreme splitting suggested in the preceding is not such when series of birds are examined, but it has been a bad habit of certain ornithologists to condemn results without consideration. In the present case a few specimens would imply that my conclusions were erroneous, as the birds vary and specimens from different localities would need to be lumped. Thus, North-west of Australia is absolutely meaningless in connection with these birds, yet it would be used by ignorant critics as if it had value, as will be noted in connection with some other birds in this volume.

When Ramsay recorded a specimen from Cardwell he named it *Podargus phalænoides*, writing: "One specimen only procured; it is looked on as a very rare bird at Cardwell"; and then recorded: "*Podargus*, sp. I have again to observe that two species, quite distinct from one another in the form of the bill as well as in colour, have been procured; these are also distinct from those obtained by my late collector, Spalding, in the same district several years ago. The species of this genus are in such glorious confusion that it is almost impossible to recognise any of them from bare descriptions. The two I have lately acquired are certainly distinct from any figured in Mr. Gould's work on the Birds of Australia."

Later, receiving birds from Derby, North-west Australia, these were determined as *Podargus gouldii* Masters, Ramsay concluding: "Like all members of this genus, this species varies remarkably in the tints and colour exhibited in its plumage; in size it agrees best with *P. phalænoides*, but on reference to Mr. Masters' description it will be seen that the two species are decidedly different."

Series, however, show that no reliance can be placed upon individual coloration and that a number of birds from Derby are very like a number of specimens from the Gulf of Carpentaria, and are only subspecifically separable at the most. Ramsay's "glorious confusion" is only dissipated by the criticism of long series and strict recognition of geographical ranges.

GENUS—MICROPODARGUS.

MICROPODARGUS Mathews, Austral Avian Record, Vol. II.,
p. 57, 1913 Type *M. ocellatus*.

SMALLER Podargine birds, with comparatively stronger bills and longer tails, with the middle tail-feathers not attenuately pointed.

In the *Austral Avian Record*, Vol. II., p. 57, 1913, I gave as differential features: "Differs from *Podargus* in its much smaller size throughout and in a comparatively stronger bill."

The bill is not so depressed as in *Podargus*, and the nostrils are smaller; the frontal bristles jutting forward and upward being more lengthened than those of the former genus.

In the wing the fourth, fifth and sixth primaries are subequal, the sixth sometimes the longest: the third generally less than the seventh.

The tail is longer than the wing, as a general rule, and though the two middle tail-feathers are pointed there is no attenuation, and the others show scarcely any points, though they cannot be called rounded at the tips.

The feet are very much smaller than in the preceding genus. As hereafter shown, the inter-relationships of the species are quite obscure, and osteological investigation is strongly indicated.

The sexes appear to be noticeably different in coloration, the female being completely rusty, while the male has the ground-colour of the under-parts whitish.



Roland Green. del.

Witherby & Co

9

MICROPODARGUS MARMORATUS.
(MARBLED FROGMOUTH).

MICROPODARGUS OCELLATUS.

MARBLED FROGMOUTH.

(PLATE 327.)*

PODARGUS OCELLATUS Quoy and Gaimard, Voy. de l'Astrol. Zool., Vol. I., p. 208, pl. XIV., 1830: Dorey Harbour, Arfak Peninsula, New Guinea.

Podargus marmoratus Gould, Birds Austr. Suppl., pl. 4, 1855: Cape York, Queensland.

Podargus marmoratus Gould, Birds Austr. Suppl., pl. 4, 1855; *id.*, Handb. Birds Austr., Vol. I., p. 94, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 581 (N.Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; Hall, Key Birds Austr., p. 55, 1899; Le Souëf, Ibis, 1899, p. 361 (N.Q.); Mathews, Handl. Birds Austr., p. 52, 1908; Barnard, Emu, Vol. XI., p. 23, 1911 (N.Q.); Macgillivray, *ib.*, Vol. XIII., p. 158, 1914 (N.Q.); H. L. White, *ib.*, Vol. XV., p. 61, 1915.

Podargus ocellatus subsp. *marmoratus* Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 635, 1892; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 542, 1901.

Podargus ocellatus marmoratus Hartert, Das Tierreich, 1897, p. 4; Mathews, Nov. Zool., Vol. XVIII., p. 283, 1912.

Micropodargus ocellatus marmoratus Mathews, List Birds Austr., p. 143, 1913.

DISTRIBUTION. Cape York Peninsula, North Queensland.

Adult male. Head, nape, and upper mantle dusky-brown with white tips and black subterminal markings to the feathers; back and upper wing-coverts chestnut-brown with pale markings to the feathers; scapulars much paler than the back, showing an elongated patch on each side of the back; bastard-wing, primary-coverts, and flight-quills chestnut-brown with white or smoky-white spots on the outer-webs and dark brown with pale mottled bars on the inner-webs of the primary- and secondary-quills—the innermost secondaries alike on both webs; tail rather paler than the back, cinnamon-brown with narrow black bars and whitish mottled bars and white tips to the feathers: space in front and under the eye- and ear-coverts chestnut-brown; sides of the forehead over the eye, and sides of the nape whitish, like the hinder cheeks, which have dark bars; the feathers at the base of the bill banded with black and white, bristly in texture, and those at the base of the forehead erectile; under-surface much paler than the upper-parts; chin and throat white with dark central shaft-streaks; breast, sides of the body, abdomen, and under tail-coverts very similar; under wing-coverts and axillaries ochreous-brown, the marginal coverts marked with dark brown; under-surface of quills pale brown with whitish mottled bars, outer-webs cinnamon with white

* The plate is lettered *Micropodargus marmoratus*.

THE BIRDS OF AUSTRALIA.

spots and marked with brown; lower aspect of tail mottled with cinnamon, brown, and white, all of which are divided into bars, and with white tips to the feathers. Eyes orange, feet yellow, bill mud-colour, palate lemon-yellow. Total length 377 mm.; culmen 32, wing 182, tail 175, tarsus 22. Figured. Collected at Cape York, North Queensland, on 13th November, 1912.

Adult female. General colour above and below chocolate or cinnamon-brown, everywhere speckled or dotted with whitish and blackish markings of various forms; the pale spots on the upper wing-coverts are few in number and somewhat large in size; the scapulars are pale smoke-brown like the innermost secondaries, both of which are paler than the back; bastard-wing, primary-coverts, and quills dark brown with paler mottled bars on the inner-webs and chocolate-brown and smoky-white markings on the outer-webs; tail rather paler than the back, with numerous pale mottled bars and whitish tips to the feathers; ear-coverts uniform chocolate-brown; sides of the forehead, above the eye, and sides of the nape whitish, forming a more or less conspicuous superciliary line; the feathers at the base of the bill barred with smoky-white, disintegrated and bristly in structure, and some of those at the base of the forehead erectile; under-surface paler than above, the pale or whitish portion of the plumage predominating over the chocolate-brown; chin and throat whitish, the feathers barred or mottled with chocolate-brown; breast, abdomen, and sides of the body rather darker, with central shaft-streaks strongly pronounced; under tail-coverts similar but somewhat paler; axillaries and under wing-coverts dusky-brown; under-surface of quills pale brown with paler mottled bars, outer-webs cinnamon with whitish spots which are margined with dark brown; lower aspect of tail mottled with brown and dull white and tinged with cinnamon. Eyes orange, feet drab, bill dull green. Total length 385 mm.; culmen 31, wing 177, tail 186, tarsus 22. Figured. Collected at Cape York, North Queensland, on the 20th June, 1912.

The female is much darker than the male, more especially on the under-surface.

Nest, Eggs and Breeding-season not recorded.

This species was added to the Australian List by Gould, in the Supplement to the Birds of Australia, from specimens procured by Macgillivray. Gould wrote: "On carefully comparing examples of this species with the original example of MM. Quoy and Gaimard's *Podargus ocellatus* in the Museum of the Jardin des Plantes, I found them to differ so greatly that I could come to no other conclusion than that they were distinct. . . . Both the specimens from which my descriptions were taken were shot by Mr. Macgillivray on the Cape York Peninsula, one on the 14th, the other on the 19th of November, 1849. These examples now grace the National Collection, where they will be available for comparison should any nearly allied species be discovered." Since that date no notes have been given of its life-history, as, though Le Souëf described "reputed" eggs, no habits were at that note added. Then Barnard wrote: "Fairly common (at Cape York); only found in thick scrubs."

Macgillivray, the younger, added (*Emu*, Vol. XIII., p. 158, 1914): "This small *Podargus* frequents the scrubs, where it has ample opportunity for concealment: consequently it appears to be a rarer bird than it really is. It is doubtful whether its nest and egg or eggs have yet been obtained. Irides yellow, bill pale yellowish-green, legs pale yellow. Stomach contents usually

MARbled FROGMOUTH.

beetles. Total length in flesh, 15 inches. Mr. Wheatley obtained nests of this *Podargus* in the scrub country bordering the Ducie River; each nest contained three eggs."

Consequently the economy of the species is still unknown. Gould having determined the Cape York form to be specifically distinct, it was so regarded until Hartert monographed the order in the *Catalogue of the Birds in the British Museum*, when he concluded: "Birds from Australia have the tail fully an inch longer than in typical *P. ocellatus*, its length ranging from 7.5 to 8 inches. Otherwise they are entirely similar to specimens of *P. ocellatus* from Papuasia, and as a few specimens from New Guinea approach and equal them in the length of the tail, this form can only be regarded as a subspecies. The specimens in rufous plumage seem to be females."

As "Hab." was given "Northern, eastern, and south-eastern parts of Australia," the last locality, now well known to be erroneous, was added on the authority of a skin from the Adelaide Museum, labelled "Adelaide, South Australia." The only locality it is known to occur is the Cape York Peninsula. There can be little hesitation in accepting the New Guinea forms as conspecific with the North Australian, as far as our knowledge at present goes, but the complexity of the species of "*Podargus*" is such that any dogmatic utterance might prove later to be completely valueless. Thus, when Ogilvie-Grant reported upon New Guinea birds (*Ibis*, Jubilee Suppl., No. 2, Dec., 1915), he wrote: "*Podargus ocellatus*. In all five specimens listed above the upper-parts are nearly uniform reddish-brown, sparingly spotted with black on the scapulars, with practically no light markings except on the wing-coverts. The more uniform-backed specimens are found both on the Arfak Peninsula and in south-east New Guinea, and seem to have no geographical significance, being found everywhere in company with more mottled examples. Males seem to have more white on the under-parts than females."

MICROPODARGUS PLUMIFERUS.

PLUMED FROGMOUTH.

(PLATE 328.)*

PODARGUS PLUMIFERUS Gould, Proc. Zool. Soc. (Lond.), 1845, p. 104: Brushes, Clarence River, New South Wales.

Podargus plumiferus Gould, Proc. Zool. Soc. (Lond.), 1845, p. 104; *id.*, Birds Austr., pt. xxv. (Vol. II., pl. vi.), 1846; Bonaparte, Consp. Gen. Av., Vol. I., p. 57, 1850; Gould, Handb. Birds Austr., Vol. I., p. 93, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; Witmer Stone, Austral Av. Rec., Vol. I., p. 151, 1913.

Podargus papuensis plumiferus Mathews, Nov. Zool., Vol. XVIII., p. 281, 1912.

Cyphorhina papuensis plumifera Mathews, List Birds Austr., p. 143, 1913.

Cyphorhina plumifera Mathews, Austral Av. Rec., Vol. II., p. 91, 1914.

Cyphorhina plumifera neglecta Mathews, *ib.*, Vol. III., p. 57, 1916: Southern Queensland.

Cyphorhina plumifera plumifera Mathews, *ib.*

Megapodargus plumifera Mathews, Austral Av. Rec., Vol. III., p. 65, 1916.

Megapodargus plumifera plumifera Mathews, *ib.*

Megapodargus plumifera neglecta Mathews, *ib.*

DISTRIBUTION. Northern New South Wales; Southern Queensland.

Adult female (?). General colour above dark fawn-brown minutely speckled with black, white and isabelline, which take the form of mottled crossbars on the flight-quills and tail-feathers; the feathers round the nostrils and base of the bill bristly in structure and black-and-white in colour; the feathers in front of the eye tawny, barred with black, and those above and behind the eye cream-white marked with black bars; the black on the head takes the form of subterminal spots with minute whitish tips; most of the feathers on the back and scapulars have black shaft-lines, some of which terminate in pear-shaped spots; some of the upper wing-coverts rather broadly tipped with cream-white like some of the marks on the outer-webs of the primary-quills; flight-quills blackish-brown with mottled crossbars and frecklings at the tips; tail rather paler than the back, with regular mottled bars which become obsolete at the tips of the feathers, shafts reddish horn-colour; under-surface paler than above, being pale sandy-buff on the throat and upper-breast where the feathers are marked with dark brown—some minutely, others more coarsely; sides of the body, abdomen and under tail-coverts cream-white, irregularly marked and mottled with dark brown; thighs brown; axillaries and under wing-coverts ochreous, the short coverts on the edge of the wing bright

* The plate is lettered *Cyphorhina plumifera*.



H. Grönvold, del.

Witherby & Co

$\frac{2}{5}$

CYPHORHINA PLUMIFERA.
(PLUMED PODARGUS).

PLUMED FROGMOUTH.

fawn colour, with dark subapical spots; under-surface of flight-quills pale brown with mottled crossbars; lower aspect of tail mottled with brown and isabelline, the pale shafts rather conspicuous. Total length 490 mm.; culmen 28, wing 230, tail 237, tarsus 24. Figured. Collected in Southern Queensland. And is the type of *C. p. neglecta*.

OF this species Gould wrote: "The only information I have to communicate respecting this beautiful *Podargus* is that it is a native of the brushes of the Clarence and neighbouring rivers in New South Wales, and that several examples have come under my notice, of which one is deposited in the Museum at Dublin, another in the Museum at Manchester, and a third was sent to me by the late Mr. Strange of Sydney. The *Podargus plumiferus* is readily distinguished from all the other Australian members of the genus by the more lengthened form of tail and by the remarkable and conspicuous tufts of feathers which spring from immediately above the nostrils; considerable variation is found to exist in the colouring of the various specimens, some being much redder than the others, and having the markings on the under-surface much less distinct and of a more chestnut tint."

No specimens were available to Hartert when he monographed the group in the *Catalogue of the Birds in the British Museum*, Vol. XVI., so that he wrote: "Dr. E. P. Ramsay considers *P. plumiferus* to be a distinct species, but I cannot distinguish it from *P. papuensis*; and if I am correct, the range of the latter species must be extended to the Richmond River district, and to New South Wales."

The authorities at the Museum at Dublin and Manchester were unable, at my request, to trace the specimens alluded to by Gould above, so that I admitted *plumiferus* as a subspecies of *papuensis*, on locality grounds alone, in my "Reference List" and also "List."

When in Australia I saw the specimen from which Ramsay concluded that the species was distinct, and another in the Macleay Museum, and I also secured a similar bird, which is here figured. These have been carefully compared, and agreed in detail. I therefore recorded in the *Austral Av. Rec.* (Vol. II., p. 91, 1914) that *plumiferus* should be considered as a distinct species, but left it in *Cyphorhina*, the genus-name used for the *papuensis* group. Recent consideration caused me to doubt the exact relationship of the bird I have with Gould's figure, so that I named my own specimen *Cyphorhina plumifera neglecta*, and it must be clearly understood that my remarks hereafter refer to this specimen.

Upon critical comparison with the known *Podargus* it does not agree exactly, and its nearest ally seems to be not *papuensis* but *marmoratus*. With rufous specimens of the latter in the British Museum, from the Gould collection labelled Cape York, it disagrees in no detail of coloration, but is immensely superior in

THE BIRDS OF AUSTRALIA.

size, and has the frontal tuft of feathers more pronounced, though nothing like the figure given by Gould.

It is acknowledged that the rufous specimens in the *marmoratus* group are females, and they have the bills smaller than the males. Consequently, as my "*plumiferus*" is a rufous bird it may also be a female (being an old skin it is unfortunately not sexed), and as it has a small bill that feature might be larger in the male.

For the present I am not recognising *Micropodargus plumiferus neglectus*.

GENUS—MEGAPODARGUS.

MEGAPODARGUS Mathews, Austral Avian Record, Vol. II.,
p. 62, 1913 Type *M. papuensis*.

Also spelt
Megapodius Mathews, List Birds Austr., p. 143, 1913.

Cyphorhina Lesson, Écho du Monde Savant, 10th year,
No. 1., col. 1068, June 15th, 1843 Type *M. papuensis*.

. Not
Cyphirhinus Schoenherr, Curc. disp. méth., p. 276, 1826.

LARGEST Podargine birds, with strong bills, and comparatively longer tails than in *Podargus*.

The bill in the male is much wider, but more depressed, than that of *Podargus*, while that of the female is a little less.

The frontal tuft seems missing or obsolete.

The wing has the fifth primary generally longest.

It may be noted that all the Podargine birds have the outer web of the first primary "serrated" as in the Owls.

The tail is long, about as long as the wing, and though the two middle tail-feathers are pointed and longer than the rest, the tips are not attenuated. The rest are not pointed, but cannot be considered rounded.

The feet are short and stout, even more so than in *Podargus*.

MEGAPODARGUS PAPUENSIS.

LARGE FROGMOUTH.

(PLATE 329.)

PODARGUS PAPUENSIS Quoy and Gaimard, Voy. de l'Astrol. Zool., Vol. I., p. 207, 1830 :
Dorey Harbour, Arfak Peninsula, New Guinea.

Podargus papuensis baileyi Mathews, Nov. Zool., Vol. XVIII., p. 281, 1912 : Cairns,
Queensland.

Podargus papuensis Gould, Birds Austr. Suppl., pl. 3, 1855 (Cape York); *id.*, Handb.
Birds Austr., Vol. I., p. 91, 1865; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 46,
1875 (N.Q.); Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 580 (N.Q.); *id.*, Proc.
Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Forbes, Proc. Zool. Soc. (Lond.) 1878,
p. 121 (N.Q.); Ramsay, Tab. List Austr. Birds, p. 2, 1888; Hartert, Cat. Birds
Brit. Mus., Vol. XVI., p. 630, 1892 (pt.); Le Souëf, Ibis, 1896, p. 312 (N.Q.);
Hall, Key Birds Austr., p. 55, 1899; Robinson and Laverock, Ibis, 1900, p. 637
(N.Q.); Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 538, 1901; Berney,
Emu, Vol. VI., p. 43, 1906 (N.Q.); Mathews, Handl. Birds Austr., p. 52, 1908;
Macgillivray, Emu, Vol. X., pp. 217-231, 1910 (N.Q.); Broadbent, *ib.*, p. 234
(N.Q.); Barnard, *ib.*, Vol. XI., p. 23, 1911 (N.Q.); Macgillivray, *ib.*, Vol. XIII.,
p. 158, 1914 (N.Q.).

Podargus papuensis baileyi Mathews, Nov. Zool., Vol. XVIII., p. 281, 1912 : Cairns,
N. Queensland.

Podargus papuensis rogersi Mathews, *ib.* : Cape York, North Queensland.

Cyphorhina papuensis baileyi Mathews, List Birds Austr., p. 143, 1913.

Megapodargus papuensis baileyi Mathews, Austral Av. Rec., Vol. III., p. 65, 1916.

Megapodargus papuensis rogersi Mathews, *ib.*

DISTRIBUTION. North Queensland.

Adult male. General colour above and below cinnamon-brown varied by dark brown
and dull white, or smoky-white mottlings. The dark pattern of the feathers on
the head, back, scapulars, upper wing-coverts, most of the primary- and secondary-
quills—towards the tips—throat, breast, abdomen, sides of the body and under tail-
coverts take the form of shaft-line streaks and usually followed by pale or whitish
tips to the feathers. The pale or whitish pattern is more pronounced on the
scapulars, where it forms an elongated patch, and on the innermost secondaries
irregular mottled bars; some of the median and greater upper wing-coverts have
large white (or slightly mottled) oval spots which are bordered with blackish on
the upper side and the inner side adjoining the shaft; bastard-wing, primary-



Roland Green, del.

Witherby & Co

$\frac{3}{8}$

MEGAPODARGUS PAPUENSIS.
(LARGE PODARGUS).

LARGE FROGMOUTH.

coverts, primary- and secondary-quills dark brown with mottled bars of cinnamon-brown and varied by chestnut, chiefly on the outer-webs, the mottling more profuse and covering nearly the whole of the feather on the secondaries; tail cinnamon-brown with mottled white bars and narrow white tips to the feathers—the pale bars bordered more or less with blackish, which is more pronounced on the lateral feathers—which are rather darker than the middle ones; the feathers at the base of the bill are much stiffened and those at the base of the forehead erectile; sides of the fore-head and in front and below the eye rufous-chestnut with white tips and narrow white bars; the short feathers surrounding the eye have black, hair-like tips; lower eyelid white at the base; under-surface paler than the upper-parts, particularly on the abdomen, sides of the body, and under tail-coverts; throat, fore-neck, and breast have many of the feathers barred with white and more or less tinged with grey; abdomen, sides of the body and under tail-coverts have the feathers broadly barred with white, dark shaft-streaks and mottlings of very pale brown; axillaries and under wing-coverts isabelline, the marginal series of the latter cinnamon-brown varied with white; under-surface of quills pale brown with whitish mottled bars on the inner-webs, the pale portion on the outer-webs inclining to isabelline; lower aspect of tail whitish varied with dark brown bars and mottlings, which take the form of bars and cinnamon-brown interspaces. Bill olive-brown, culmen brown, eyes red, feet olive-brown. Total length 580 mm.; culmen 35, wing 298, tail 290, tarsus 32. Figured. Collected at Cape York, North Queensland, on the 8th of September, 1911.

Adult female. Similar but browner, especially above.

Nest. Constructed loosely of sticks.

Eggs. Clutch, one 48–50 mm. by 33–36.

Breeding-season. September to December (or February).

THIS species was added to the Australian List by Gould in the *Supplement to the Birds of Australia*. His remarks read: "Of this fine bird several specimens were procured during the voyage of Her Majesty's Ship *Rattlesnake*, under the command of Captain Owen Stanley, with Mr. Macgillivray as Naturalist, whose names will ever hold a prominent place in the annals of Australian zoology. All the specimens were obtained at Cape York, the contiguity of which to New Guinea induced me to believe the bird to be identical with the one described and figured by MM. Quoy and Gaimard in the voyage of the *Astrolabe* under the name of *Podargus papuensis*; and this belief proved to be correct on a comparison of Australian examples with the New Guinea birds in the museums of Paris and Leyden. The *P. papuensis* is the largest species of the genus yet discovered; the beauty of its markings and the extreme length of its cuneate tail render it also one of the most graceful. The only specimen that came into my possession from Mr. Macgillivray for the purpose of figuring, before being deposited in the National Collection, was a male. This is of a light brown colour, beautifully marbled on the under-surface with large blotches of white. I have another specimen from Cape York, which is said to be the female; and such, judging from its redder colouring and smaller size, I believe to be the case, for a similar difference exists between the sexes of *P. marmoratus*."

THE BIRDS OF AUSTRALIA.

Little seems to have been recorded about this species, save that Le Souëf described the eggs in 1896, forty years after it was first noted as an Australian bird. No notes seem to have been taken of its habits, which seems quite justifiable, as little could be observed on a collecting trip in such a far locality. It was noted that it was not much disturbed by gunfire, as might be expected from the locality, whatever its normal habits might be.

The genus *Podargus* has been credited with the absence of an oil gland, but Furbringer recorded it in the allied genus *Batrachostomus*, and in the following note Berney's remark should be noted.

Berney's note is, as usual, worthy of quotation (*Emu*, Vol. VI., p. 43, 1906): "*Podargus papuensis*. I do not often see them, and then, of course, they are always in timber. Being nocturnal, and naturally protected by their colour and the attitude they affect when roosting, they are, I dare say, more common than one would at first suppose. My records of them refer to all seasons of the year. In August, 1904, I shot one for examination, which gave among others the following details: Sex, female; eggs in ovaries the size of swan shot; total length, 16 inches; wing $8\frac{11}{16}$ inches; tail $7\frac{1}{2}$ inches; tarsus $1\frac{1}{16}$ inches; bill to gape $2\frac{1}{4}$ inches; width of gape $1\frac{5}{8}$ inches. Throughout the plumage, which is most soft and owl-like, there is a rusty hue caused by minute freckles of red, which is most conspicuous on the outer webs of the scapularies, the tail-feathers (all but the centre pair) and the extremities of the primaries. The markings of the under-surface are richer than those of the upper, the lights being lighter and the darks darker. The extremities of the tail-feathers are very pointed. The legs are quaintly chubby, and well earn for the bird its generic name; the toes, being thick and swollen at the base, taper rapidly to their extremity. Under the feathers the body is freely covered with soot-coloured down. On each side of the oil gland is a prominent powder patch. It was the toughest bird to pluck that I ever tried to pull the feathers off: many of the wing-quills broke off in their sockets. This species is fond of roosting in pairs, sometimes four together in the same tree."

Barnard, writing of Cape York (*Emu*, Vol. XI., p. 23, 1911), states: "Fairly common in forest country. Breeds in any timber in the forest. Nest the usual scanty stick structure, placed on a horizontal fork of a tree. Breeding-months from September to February. The first nest taken by me contained two eggs, and I had previously been under the impression that one egg only formed the clutch. They measure (a) 1.97×1.32 , (b) 1.87×1.28 . This is evidently a rare occurrence, as all the other nests found contained only one egg, or one young bird. From information obtained from Mr. F. L. Jardine and others, I find that this species migrates, and frequently settles on the pearling boats in

LARGE FROGMOUTH.

the Strait between Cape York and New Guinea. The flight across takes place only at night."

Macgillivray (*Emu*, Vol. XIII., p. 158, 1914) confirms this account: "*Podargus papuensis*. Papuan Frogmouth. Fairly common at Cape York, where it is met with both in open forest and scrub. When in the latter it usually roosts low down. It utters a weird and ghostly 'laugh'—a rapid 'Hoo-hoo-hoo'—at times. It also has a call like *P. strigoides*, a series of 'Ooms' half an hour at a time, and at night. Nesting starts in October, and continues until January. Only one egg is laid, and there are great variations in size and shape. On one occasion, when he was climbing to a nest containing a young bird, the parent birds kept flying round and snapping their bills within a few feet of Mr. M'Lennan's head, and one kept uttering the laughing note previously heard at night. Irides orange, bill yellowish-olive, legs olive-yellow. Stomach contents usually beetles. In September numbers of these birds were seen flying over Thursday Island, making for the mainland."

These seem to be the principal notes made regarding this species in Australia, and the technical history seems to be as brief. Gould did not differentiate between the New Guinea and Australian forms, and in the *Catalogue of the Birds in the British Museum*, Vol. XVI., Hartert made no comment on this matter, observing: "The Museum possesses few properly sexed specimens," and, on the figure alone, referred *P. plumiferus* Gould to this species.

When I drew up my "Reference List" (*Nov. Zool.*, Vol. XVIII., 1912) I separated the Australian forms from the New Guinea, and, moreover, admitted two subspecies in Australia, naming them as follows—

Podargus papuensis baileyi.

Differs from *P. p. papuensis* in being lighter above, and in having the white spotting to the feathers of the under-surface more marked, and the bill much smaller. Type Cairns, Queensland.

Podargus papuensis rogersi.

Differs from *P. p. baileyi* in its paler coloration, and in having a thick bill, but not as thick as the New Guinea bird. Type, Cape York, Queensland.

In my "List" in 1913 I conservatively regarded these as inseparable, but re-consideration with more material necessitates their reinstatement.

Thus I find that a series of Cairns birds is separable from a series from Cape York by their obviously darker coloration above and below, and that the males are slightly larger than the females, and have broader bills.

THE BIRDS OF AUSTRALIA.

I therefore admit two subspecies—

Megapodargus papuensis baileyi Mathews. Cairns District, North Queensland.

Megapodargus papuensis rogersi Mathews. Cape York, North Queensland.

In the Jubilee Supplement, No. 2, *Ibis*, 1915, writing upon the birds of Dutch New Guinea, Ogilvie-Grant did not attempt to indicate the New Guinea races of this species, nor touch upon the subject at all. Nevertheless, there are probably several races in New Guinea easily distinguishable when series are available.

GENUS—ÆGOTHELES.

ÆGOTHELES Vigors and Horsfield, Zool. Journ., Vol. II.,
p. 550, April, 1826. Type *A. cristata*.

Also spelt—
Ægotheles Lesson, Traité d'Ornith., p. 263, 1830.

SMALLEST Ægotheline birds, with small bills, long, rounded wings, long, rounded wedge-tails and small feet.

The bill is apparently very small, but gape large, culmen strongly ridged, sides flattened, tip very hooked, lateral edges straight, and entire not toothed: tip of lower mandible decurved and hollow as in *Podargus*. Nostrils are evident as slits on each sides of the culmen placed well forward near tip, hidden by an operculum. There are no true rectal bristles, but along the upper edge of the culmen bristles have developed, projecting upwards and forwards, and becoming very pronounced at the forehead.

The wing is long and rounded, the fourth primary longest, the third about equal to the fifth, the fourth less than the sixth, and the first shorter than the eighth.

The tail is long, the ten feathers broad and rounded at the tips, the whole wedge shaped, the outer tail-feather about two-thirds the length of the middle pair, which do not extend beyond the next pair.

The legs long and slender (for the Order), the toes long, the middle claw not pectinate. The tarsus is covered with regular scutellæ, both in front and behind.

The preceding diagnosis is based upon the genotype of *Ægotheles*. Hartert admitted a subfamily Ægothelinæ, which I here rank as a family, writing: "Nostrils situated near the tip of the bill, obvious and open; bunches of elongated erect loral bristles with long lateral filaments; no distinct powder down patches; tarsus longer than middle toe; third and fourth quills longest."

Two very distinct groups are included in this: one, the species like *cristata*, the true *Ægotheles*, as *bennetti* Salvadori and D'Albertis, *wallacei* Gray, and *salvadorii* Hartert, the other *crinifrons* Bonaparte (= *psilopterus* Gray), *insignis* Salvadori and *pulchra* Hartert, etc. These differ from the true *Ægotheles* in being larger, and being differently coloured. As regards coloration they agree so closely with the species of *Batrachostomus* that *crinifrons* was described by Bonaparte and also Gray under that genus-name. The

THE BIRDS OF AUSTRALIA.

bill formation obviously separates this group, but it once more raises the "coloration *versus* structure" controversy. We are again confronted with a group agreeing in colour but differing in structure from another group. To associate it with a distinct group as regards coloration merely on account of the bill features is quite unnatural as, in addition to the coloration, the tail is in agreement with the former group. Such a confusion of characters necessitates recourse to the osteology of these species, and this is at present unknown as regards details. Nevertheless, it must be conceded that the *crinifrons* group should be indicated by name, and I therefore provide the new name

EUÆGOTHELES

and name *psilopterus* Gray (= *crinifrons* Bonaparte) as type *Euægotheles crinifrons*. The wing has the fourth and fifth primaries subequal, the third subequal with the sixth, the second less than the seventh, the first being short. The frontal bristles are more pronounced, and the legs are shorter and stouter than in *Ægotheles*, and while the scutes on the front of the tarsus are well developed, the tarsal covering on the back is indistinct, no definite scutes or hexagonal scales being observed.

I have suggested that a consideration of osteological features might re-group the species of *Batrachostomus* and *Podargus*, and show that some species allotted to each were more closely allied to species in the other group, but I think that the re-arrangement will naturally include the birds ranged in the *Ægothelinæ* by Hartert, and that probably the group above named will be classed with the *Batrachostomus* species. There is a curious complex to be puzzled out, for although *Ægotheles* has been classed beside *Podargus*, the anatomy shows much discord, and it may be that it has less relationship than has recently been granted it.

The genus-name *Ægotheles* has been commonly referred to Vigors and Horsfield in the XVth Volume of the Linnean Society's Transactions, which was published in 1827. However, in 1826 Stephens had published the name, but only as a *nomen nudum*. I now find that in the April 1826 number of the *Zoological Journal* a report of the reading of Vigors and Horsfield's paper was printed, and therein appears: "Mr. Vigors read a continuation of the 'Catalogue of New Holland Birds in the Collection of the Linnean Society,' by Dr. Horsfield and himself. In this portion of the paper the Australian species of the family of *Caprimulgidæ* were described, and the birds themselves, belonging to the genera *Podargus*, Cuv., *Caprimulgus*, Auct., and *Ægotheles*, Vigors and Horsfield, of which the type is the *Crested Goatsucker* of White's *Journal* and Phillip's *Botany Bay*, were exhibited to the meeting." This has priority over Stephens' publication, which was later than April, 1826, and is, moreover, definite and usable.



Roland Green, del.

Witherby & Co.

$\frac{3}{7}$
AEGOTHELES CRISTATA.
(OWLET NIGHTJAR)

ÆGOTHELES CRISTATA.

OWLET NIGHTJAR.

(PLATE 330.)

CAPRIMULGUS CRISTATUS White, Journ. Voyage New South Wales, p. 241, and pl. opp., 1790 (early): New South Wales.

Crested Goatsucker Phillips, Voyage Botany Bay, pl. opp. p. 270, 1789 (N.S.W.).

Caprimulgus cristatus White, Journ. Voy. N.S.W., p. 241 and pl. opp., 1790.

Caprimulgus novæhollandiæ Latham, Index Ornith., Vol. II., p. 588, 1790: based on Phillips' pl.: New South Wales; Stephens, in Shaw's Gen. Zool., Vol. X., p. 170, 1817; Vieillot, Nouv. Dict. d'Hist. Nat. (Levr.), Vol. X., p. 234, 1817.

New Holland G(oatsucker) Latham, Suppl. Gen. Synops. Birds, Vol. II., p. 261, 1801.

Banded G(oatsucker) Latham, *ib.*, p. 262, pl. 136; *id.*, Gen. Hist. Birds, Vol. VII., p. 342, pl. cxv, 1823.

Caprimulgus vittatus Latham, Index Ornith. Suppl., p. lviii, 1801: founded on the Banded G. = New South Wales; Stephens, in Shaw's Gen. Zool., Vol. X., p. 152, 1817; Vieillot, Nouv. Dict. d'Hist. Nat. (Levr.), Vol. X., p. 232, 1817.

Podargus ? novæhollandiæ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 2, p. 93, 1826.

Ægotheles novæhollandiæ Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 197, 1827; Gould, Birds Austr., pt. 1 (Vol. II., pl. 1), 1840; Bonaparte, Consp. Gen. Av., Vol. I., p. 58, 1850; Gould, Handb. Birds Austr., Vol. I., p. 79, 1865; Diggles, Ornith. Austr., pt. xvi., pl. 17, 1868; Pelzeln, Ibis, 1873, p. 107; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; Legge, Paper, Proc. Roy. Soc. Tasm., 1886, p. 238, 1887; North, Austr. Mus. Cat., No. 12, pl. xiv., fig. 11, 1890; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 651, 1892; Hall, Key Birds Austr., p. 55, 1899; Robinson and Laverock, Ibis, 1900, p. 637 (N.Q.); Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 542, 1901; Le Souëf, Emu, Vol. II., p. 150, 1903 (N.T.); H. E. Hill, *ib.*, p. 161 (Vic.); Carter, *ib.*, Vol. III., p. 95, 1903 (N.W.A.); Berney, *ib.*, Vol. IV., p. 168, 1905 (N.Q.); Legge, *ib.*, p. 173 (Tas.); Hartert, Nov. Zool., Vol. XII., p. 216, 1905 (N.T. = N.W.A.); Berney, Emu, Vol. VI., p. 43, 1906 (N.Q.); Batey, *ib.*, Vol. VII., p. 4, 1907 (Vic.); G. F. Hill, *ib.*, p. 20 (Vic.); Austin, *ib.*, Vol. VII., p. 31, 1907 (N.S.W.); Ingram, Ibis, 1907, p. 401 (N.T.); Mathews, Handl. Birds Austral, p. 52, 1908; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 342, 1909; Sassi, Journ. für Orn., 1909, p. 381; Whitlock, Emu, Vol. VIII., p. 188, 1909 (W.A.); Gibson, *ib.*, Vol. IX., p. 75, 1909 (S.W.A.); Fletcher, *ib.*, p. 81 (Tas.); Whitlock, *ib.*, p. 193,

THE BIRDS OF AUSTRALIA.

- 1910 (W.A.); Howe, *ib.*, p. 230 (Vic.); Littler, Handb. Birds Tasm., p. 79, 1910; Macgillivray, Emu, Vol. X., pp. 23, 94, 97, 1910 (N.S.W.); Broadbent, *ib.*, p. 234 (N.Q.); G. F. Hill, *ib.*, p. 270, 1911 (N.W.A.); Wilson, *ib.*, Vol. XII., p. 32, 1912 (Vic.); Stone, *ib.*, p. 117 (Vic.); G. F. Hill, *ib.*, p. 255, 1913 (N.T.); Chandler, Emu, Vol. XIII., p. 37, 1913 (Vic.); Macgillivray, *ib.*, p. 159, 1914 (N.Q.); Barnard, *ib.*, p. 206 (N.T.); Burrell, *ib.*, p. 216 (N.S.W.); Barnard, *ib.*, Vol. XIV., p. 42, 1914 (N.T.); Cheney, *ib.*, p. 206, 1915 (Vic.); H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.).
- Ægotheles lunulata* Jardine and Selby, Illus. Ornith., Vol. III., pl. 149, 1835: New South Wales.
- Ægotheles australis* Swainson, Classif. Birds, Vol. II., p. 338, 1837: New South Wales.
- Ægotheles cristatus* Gray, List Genera Birds, p. 7, 1840.
- Ægotheles leucogaster* Gould, Proc. Zool. Soc. (Lond.) 1844, p. 106: Port Essington, Northern Territory; *id.*, Birds Austr., pt. xvi. (Vol. II., pl. 2), 1844; Bonaparte, Consp. Gen. Av., Vol. I., p. 58, 1850; Gould, Handb. Birds Austr., Vol. I., p. 81, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, *ib.*, Ser. 2, Vol. II., p. 166, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 2, 1888; Le Souëf, Ibis, 1896, p. 312 (N.Q.); Witmer Stone, Austral Av. Rec., Vol. I., p. 151, 1913; H. L. White, Emu, Vol. XV., p. 61, 1915.
- Ægotheles rufescens* (not of Salvadori) Hall, Victorian Naturalist, Vol. XVIII., p. 60, 1901: Fitzroy River, North-west Australia.
- Ægotheles rufa* Hall, *id.*, *ib.*, p. 89: New name for *Æ. rufescens* Hall; *id.*, Emu, Vol. II., p. 50, 1902 (N.W.A.); Mathews, Handl. Birds Austral, p. 53, 1908; *id.*, Emu, Vol. IX., p. 57, 1909 (N.W.A.); G. F. Hill, *ib.*, Vol. X., p. 270, 1911 (N.W.A.); H. L. White, *ib.*, Vol. XV., p. 61, 1915.
- Ægotheles cristata cristata* Mathews, Nov. Zool., Vol. XVIII., p. 284, 1912; *id.*, List Birds Austr., p. 143, 1913; S. A. White, Emu, Vol. XIV., p. 187, 1915 (Central).
- Ægotheles cristata murchisoniana* Mathews, Nov. Zool., Vol. XVIII., p. 284, 1912: East Murchison, West Australia; *id.*, List Birds Austr., p. 144, 1913.
- Ægotheles cristata leucogaster* Mathews, Nov. Zool., Vol. XVIII., p. 284, 1912; *id.*, List Birds Austr., p. 144, 1913.
- Ægotheles cristata rufa* Mathews, Nov. Zool., Vol. XVIII., p. 284, 1912; *id.*, List Birds Austr., p. 144, 1913; *id.*, South Austr. Ornith., Vol. III., p. 71, 1917 (N.W.A.).
- DISTRIBUTION. Australia; Tasmania (New Guinea).

Adult female.—General colour above cinnamon with obsolete bars and mottlings of pale brown including the back, wings, and tail; marginal upper wing-coverts uniform cinnamon; inner-webs of the bastard-wing, primary-coverts and quills dark brown, outer-webs cinnamon barred or mottled with pale brown, but more coarsely than the back; tail more broadly barred with cinnamon and dark brown which changes to mottlings at the tips, the outer feathers dark brown on the inner-webs with pale mottled bars; crown of head, nape, and hinder face blackish; a double collar on the hind-neck cinnamon like the feathers on the fore-part of the head and sides of the neck; a spot of dull white feathers on the sides of the crown; ear-coverts cinnamon with black shafts which are extended into hair-like tips; the bristles at the base of the fore-head and in front of the eye black; chin whitish with black

OWLET NIGHTJAR.

hair-like shafts to the feathers; fore-neck, breast, and under wing-coverts tawny-buff, the feathers on the breast freckled with minute dark dots; abdomen, flanks, thighs, and under tail-coverts silky-white with dark bases to the feathers; under-surface of quills brown with pale mottlings; lower aspect of tail pale brown barred and mottled with pale cinnamon. Eyes brown, feet creamy-brown, bill black. Total length 250 mm.; culmen 11, wing 141, tail 123, tarsus 23. Figured. Collected on Avergne Station, Northern Territory, on the 26th of June, 1902.

Adult male. Similar to the adult female.

Southern birds have dark greyish-brown instead of rufous in the general coloration.

Fledgling. With down still adhering are like the above dark form.

Nestlings. Are covered with white down.

Nest. A hole in a tree lined with leaves.

Eggs. Clutch, three or four, white 26.5 to 31 mm. by 21 to 23 (Victoria, October and November).

Breeding-season. September to December.

THIS beautiful little bird was not observed or collected by the party accompanying Captain Cook, as far as we have any record, but it was secured by the settlers, and simultaneously appeared in the volumes of travel provided by Phillips and White. The former work, *Voyage to Botany Bay*, seems to have been published first, as the title page is dated 1789, the dedication Nov. 26, 1789, and the latest date on a plate is Nov. 26, 1789. The bird was termed "The Crested Goatsucker," and the plate is dated Oct. 20, 1789. No Latin equivalent was provided by Phillips, but Latham incorporated the species in his *Index Ornithologicus*, Vol. II., p. 588, proposing *Caprimulgus novæhollandiæ* for Phillips' Crested Goatsucker, pl. opp. p. 270. The date of Latham's work is 1790, but no exact date of publication is yet known, while it has been quoted as not appearing until 1791. At any rate, it must have been very late in 1790, and in the meanwhile White's *Journal Voyage New South Wales* appeared, and on p. 241 The Crested Goat Sucker, *Caprimulgus cristatus*, was described, and a plate given opposite dated Dec. 29, 1789. This name seems to have absolute priority, and as an item of interest it may be recorded that White's *Journal* was reviewed in the *Gentleman's Magazine*, Vol. LX., pt. II., p. 742, Aug., 1790, and in that periodical books were not reviewed immediately upon publication.

Among the Watling drawings two of this bird were included, and when Latham wrote up his Second Supplement to the General Synopsis Birds in 1801, under the New Holland G(oatsucker), p. 261, he observed: "In some drawings in possession of Mr. Lambert, I observed one very similar, though smaller; but does not seem to differ sufficiently to require a separate description." He then included as a separate species the "Banded G(oatsucker). Inhabits New South Wales, where it is called by the English, *Musquito Hawk*, a name, it must be remarked, the *Goatsucker* of North America is known by; most

THE BIRDS OF AUSTRALIA.

frequent in *July*." A reproduction of Watling's painting was attached as pl. CXXXVI. In the *Index Ornith. Suppl.*, p. lviii, simultaneously published, he proposed the Latin equivalent *C(aprimulgus) vittatus* for the Banded Goatsucker.

When Vigors and Horsfield worked through the Australian birds in the collection of the Linnean Society they proposed the new genus *Ægotheles* for this species, but the only note reads: "This bird is called by the natives *Teringing*'. Mr. Caley cannot exactly discover in his Notes where he met with his specimen; but, as far as he recollects, it was shot in the woods below Sydney."

Consequently Gould's field notes are the earliest record of its life-history, and they are so complete that little has really been added. I here transcribe them: "This very interesting little Nightjar possesses a great range of habitat, being found in every part of Tasmania, and throughout the southern portion of Australia, from Swan River on the western coast to Queensland on the eastern; time, and the continued exploration of that vast country, can alone determine how far it may be found to the northward: it is a stationary species, inhabiting alike the densest brushes near the coast and the more thinly wooded districts of the interior. While rambling in the Australian forests I had the good fortune to meet with more than an ordinary number of specimens of this curious bird. I also procured its eggs and considerable information respecting its habits and actions, which differ most remarkably from those of the other members of the family (*Caprimulgidæ*), and, on the other hand, assimilate so closely to those of the smaller Owls that the English name of Owlet Nightjar has been assigned to it.

"During the day the bird resorts to the hollow branches or spouts, as they are called, and the holes of the gum-trees, sallying forth as night approaches in quest of insects, particularly small *Coleoptera*. Its flight is straight, and not characterised by the sudden turns and descents of the *Caprimulgi*. On driving it from its haunts I have sometimes observed it to fly direct to a similar hole in another tree, but more frequently to alight on a neighbouring branch, perching across and never parallel to it. When assailed in its retreat it emits a loud hissing noise, and has the same stooping motion of the head observable in the Owls; it also resembles that tribe of birds in its erect carriage, the manner in which it sets out the feathers round the ears and neck, and in the power it possesses of turning the head in every direction, even over the back, a habit it is constantly practising. . . . While traversing the woods, the usual mode of ascertaining its presence is by tapping with a stone or a tomahawk at the base of the hollow trees, when the little inmate will almost invariably ascend to the outlet and peep over to ascertain the cause of disturbance. If the tree be lofty, or its hole inaccessible,

OWLET NIGHTJAR.

it will frequently retire again to its hiding-place, and there remain until the annoyance be repeated, when it flies off to a place of greater security. In these holes, without forming any nest, it deposits its eggs, which are four or five in number, perfectly white, nearly round, and about one inch and a line in length and eleven lines in breadth. At least two broods are reared by each pair of birds during the year. I have known the young to be taken in Tasmania in October, and in New South Wales I have procured eggs in January.

“Specimens from Tasmania, Swan River, South Australia, and New South Wales present considerable difference in the colour and markings of the plumage, but none, so far as I have yet seen, of sufficient importance to justify their separation into distinct species; in some the nuchal band and the circular mark on the head are very conspicuous, while in others scarcely a trace of these markings is observable; these variations do not appear to occur in certain localities only, but are generally found in all.” Gould differentiated as a distinct species the Northern Territory form, of which he wrote: “This is altogether a larger and more powerful bird than the *Ægotheles novæhollandiæ*; besides which, the white colouring of the lower part of the belly will at all times serve to distinguish it from that species.” Gilbert states that it is abundant in most parts of the settlement at Port Essington, “where it is frequently seen flying about at twilight, and occasionally during the day. On the approach of an intruder it flies very heavily from tree to tree, and on alighting invariably turns round on the branch to watch his approach, moving the head all the time, after the manner of the Hawk tribe.”

Mr. T. P. Austin has kindly forwarded me the following note from Cobbora, New South Wales: “The Owlet Nightjar is a species which might appear to be uncommon, but as it passes the day in hollow trees, naturally escapes notice to a great extent, but I really think they are fairly numerous in the district. Although strictly a nocturnal species, they have a peculiar habit of calling from their hiding-places during the day, more especially in dull or rainy weather. I often hear them, but seldom see them, as they just utter three notes, and that is all that is heard: this might happen at any time of the day. If their roosting-hollow is low down, sometimes they will flush at the least sound of approaching danger. I have often seen them fly from stumps, low hollow branches, etc., as I rode by. Others will allow themselves to be handled rather than take wing. I once just caught sight of one as it came to the entrance of a hollow; at once it went back tail first; before I could make it flush I struck the hollow branch with a stick about a dozen times. One bird calls quite close to my house nearly every night, although I have never looked for it during the day; I think it lives in a large dead hollow box-tree, as that is where the call note always appears to come from, and it is most regular in

THE BIRDS OF AUSTRALIA.

calling ; while sitting out in my garden during the hot summer nights, I found it always calls about the same time, at from 8.10 p.m. to 8.20 p.m. Twice it has come into my house of an evening, and one early morning when I went into my bathroom for a shower, I found it perched on top of my photography screen. When handled they show very little sign of fear, their big round eyes look at you with an expression 'I know you are not going to hurt me, so I am not afraid.' They nest in all kind of places, some high up in large trees, others in low stumps, and I have known them to use old nesting-holes in banks made by Redbacked Kingfishers. Some make their nests in shallow hollows in horizontal branches, others will go down a perpendicular stump as much as ten or twelve feet. All the nests I have examined have been made of about a couple of hands full of *Eucalyptus* leaves. They usually lay three eggs, sometimes four, and the shell is as hard as any egg I know of which is three times its size."

Mr. E. J. Christian has written me from Victoria : " I find this species here only in the dead trees along the creek. It is chiefly seen in the evening, just as the sun goes down, for then it is not too late for many insects to have retired. It is a most valuable bird, as it catches moths, grasshoppers, beetles, etc., in its large mouth. Its favourite haunt is in a hole in a dead tree, or a hollowed-out thick bough which has had the end broken off. Its flight is perfectly straight, fast and noiseless."

Mr. F. E. Howe's notes read : " Between Ringwood and Bayswater, Victoria, this bird appears to be fairly numerous, but they are very local. In a certain paddock we are always sure of flushing them from the hollows of a few trees, that seem to be a favoured camping-ground of theirs. They always meet us half-way, that is to say, they come to the mouth of the hollow and are watching us as we see them. When alarmed by a stick whizzing by they fly straight into another hollow ; there is no uncertainty, no looking for a place of refuge, but a straight flight to and into the hole. If we dislodge them again they fly into another hole. In doing this they do not fly first on to a limb, but go straight in. In the breeding season the hollow is always lined with eucalyptus leaves, and thereon they deposit four or five glossy white eggs, slightly elliptical. Mr. J. A. Ross found a nest in the hollow of a Mallee bush at Carina in 1908 containing three eggs, and upon revisiting it a week later the hollow was untenanted, and the eggs found broken on the ground beneath. Its flight is very soft and straight, and the wings are moved at a fairly fast rate. In the Murray pines at Pine Plains they are fairly common, and we flushed a bird from a hollow : the bird had 'jumped' a nest of *Barnardius barnardi*, and she was sitting on her own as well as the eggs of the parrot."

OWLET NIGHTJAR.

Mr. Isaac Batey, of Drouin, Victoria, wrote in the *Emu* (Vol. VII., p. 4, 1907): "It was well into the 'fifties when we had our first intimation of this bird by its peculiar whistling call. From then till now it appeared rare. Within the last three years one was frequently heard and seen."

Writing of the Ararat District, Victoria, in the same volume, p. 20, Mr. G. F. Hill recorded: "This appears to be a rather common bird here. A harsh cry heard every sunny morning during the winter was for a long time difficult to locate, but after the expenditure of some patience an observer was rewarded by seeing one of these birds sitting at the mouth of its hollow, repeating its cry many times while it enjoyed the warmth of the rising sun." Mr. F. E. Howe added (*Emu*, Vol. IX., p. 230, 1910): "This form is very numerous all through the Mallee, and nests containing eggs and young were found in the small dead timber."

Macgillivray recorded in the *Emu* (Vol. X., 1910) a series of interesting notes concerning birds nesting in the Barrier Range of New South Wales, and there wrote: (p. 23) "A Little Nightjar (*Ægotheles novæhollandiæ*) flitted away from her leaf-lined hollow, in which she had not yet laid. These interesting little birds are common throughout this country, and their 'Churr-churring' note is frequently heard at night; they nest during September and October, laying four or, very rarely, five eggs. Usually the eggs are pure white, but sometimes possess indistinct spots or markings, which in some form a zone at the larger end. (p. 94) We went through a box flat, to find an Owlet Nightjar's (*Æ. novæhollandiæ*) nest, containing downy young, in a leaf-lined hollow. These little birds present a curious appearance, as the white down that clothes them when they emerge from the shell still adheres to the feather-tips until they are nearly fledged. (p. 97) We found a Nightjar's (*Æ. novæhollandiæ*) nest, containing four downy young ones. These birds always hear one coming, and the little rat-like head, with round, bright eyes, looking out of a hollow, is the first intimation of a nest which otherwise would be passed by. The birds sit more closely when incubating."

A note by Berney in the *Emu* (Vol. IV., p. 168, 1905) reads: "These little birds appear to vary much in plumage. I have taken a detailed description of one shot near this station (Wyangarie, North Queensland). Although the Nightjar sleeps all day, it constantly wakes and calls from out the hollow limb in which it roosts, 'Chirk, chirk, chirk,' and goes to sleep again. I have heard them at this often and often, but never knew what to put it down to until to-day, when, locating the sound in a dead tree, I frightened out the bird. I hear a cry at night that I put down to this bird, but it is then short and abrupt—'Che'ok' or 'Che'oak'—and uttered disconnectedly. The day-call is just as I have written it."

THE BIRDS OF AUSTRALIA.

In the VIth Volume (p. 43, 1906) Berney added : " Though not often seen, on account of its being a nocturnal bird that passes the day within hollow limbs, yet it is fairly numerous along the river, from whence at night it sallies out across the open downs in search of insects. It may often be seen hawking round the buildings here. A female bird that I obtained on 13th January gave measurements as follows : Total length, $9\frac{1}{4}$ inches ; wing, $5\frac{3}{8}$ inches ; tail, $4\frac{7}{8}$ inches ; tarsus, 1 inch ; culmen, $\frac{3}{8}$ inch ; bill to gape, 1 inch ; width of gape, 1 inch. Just above the ear-coverts, from the upper portion of what may be called the facial disc, springs a small tuft of feathers which, although it does not show on a dead specimen, is conspicuous during life, and gives one the idea that the bird has waxed its eyebrows."

In the *Emu* (Vol. XIII., p. 216, 1914) Burrell gave a note about Owlet Nightjar nestlings, and a photo was shown on p. 217. These nestlings, although still in down, seemed precocious, and the two eldest left the nest, but their fate was not known. It would have been valuable to have learned whether the old birds fed those young or not. I do not see that these birds have been accused of moving their nestlings, but *Podargus* have been credited with doing so. If these birds act like *Podargus* the two elder nestlings above noted might have been accommodated elsewhere, and looked after by their parents.

Mr. Edwin Ashby has sent me a note : " This species is not uncommon in the higher Stringy bark ranges of the Adelaide Hills. It sleeps in hollow logs during the day, and can be frightened out in daylight by knocking a stick against the trees. Specimens from Port Keats, Northern Territory, are sprinkled with rufous colour over the pale parts, especially the pale ring round the neck and the upper-breast."

Mr. Sandland writes : " Fairly common at Balah, South Australia." Mr. J. W. Mellor has added : " In the early days these pretty little ' Moth Owls,' as they are called, were common at the Reedbeds near Adelaide, but now they are here no more ; the cutting down of the trees with their gnarled and twisted boughs and hollows has robbed the bird of its natural nesting- and living- places, for it not only makes its nest in the hollows, but makes its home in them during the day, sallying forth at night in search of flies, moths, beetles, etc. ; it takes its food on the wing, skimming softly through the air like some large grey moth, and snapping up its prey as it goes along. Its nest is merely the rotten wood in the hollow, upon which it lays four and sometimes five pearly white eggs, resembling those of the Kingfisher, as they are roundish in form. I saw this bird at Stansbury, York Peninsula, on April 14, 1911, the country being she-oak and large mallee, with here and there a peppermint gum with inviting hollows in which it could live and breed."

OWLET NIGHTJAR.

Mr. J. P. Rogers noted at Melville Island: "Cooper's Camp, Nov. 5, 1911. One of these birds is heard occasionally, but have not seen it yet. Dec. 10, 1911. This species is heard in the daytime occasionally, usually on dull rainy days: the day-call is loud and harsh; at night the call is squeaky. Camp 10 miles S.E. of Snake Bay, Jan. 13, 1912. Some birds are heard calling every day. The weather was dull and rainy all the time I was at the north side. I believe the bird to be more numerous here than at Cooper's Camp. In the west I always found it in small hollow trees: perhaps the reason of this was that it was easy to dislodge from the small trees, and difficult from the large ones, and I did not beat the large trees with an axe long enough."

Mr. Tom Carter has written me: "This quaint little bird was occasionally noted in the cavities of cliffs of the North-west Cape ranges, and also in hollow 'spouts' of the White Gum trees on the inland creeks, but it was far from common. About Broome Hill and the timbered south-west it is numerous, but easily overlooked by those unacquainted with its habits. It spends the day in deep holes (small apertures, usually going upwards) in the trunks and branches of the trees, either growing or dead. On two occasions I have seen a bird sleeping in a hollow log on the ground. Once I disturbed a fledgling, in broad daylight (10 a.m.), from a patch of rushes in one of my paddocks, and shot it, not knowing what it was. The adult birds make a peculiar shrill, chattering noise, somewhat like the cry of the Brown Hawk (*Ieracidea*), which is frequently heard in the daytime, and is caused by the bird coming to the aperture of its sleeping-place and vigorously scolding a Tree Creeper (*Climacteris*) or some other bird that has inadvertently disturbed its slumbers. I have read that some observers state that a sharp blow with an axe or stone on the trunk of a tree occupied by one, or a pair of these birds, will cause it to hastily emerge, but my experience is that it takes a very great amount of hammering to make it do this, in fact, it usually makes the bird sit tighter inside the tree. One of them, that was once frightened out of its hole by much throwing of sticks and stones, flew swiftly away, and perched in another tree, about eighty yards distant, with its body *crossways* to the small branch, and its feathers so compressed as to make it appear about half its usual size. In fact, I at first took it to be a Honey eater (*Ptilotis ornata*) and could not be sure of its identity until using my binoculars. When disturbed in the daytime these birds fly very swiftly, and often go straight to a hole in another tree, perhaps a hundred yards distant. The breeding-months appear to be August and September. Recently fledged birds were noted Sept. 27, 1908, Oct. 2, 1908, and Oct. 17, 1908. At this age they usually have peculiar 'streamers' of the nestling down adhering to the long bristles

THE BIRDS OF AUSTRALIA.

of the head. One immature bird was found dead, having fractured its skull by flying against the wire of a fence."

The species was simultaneously named by White and Latham, and Swainson simply gave White's figure a new name. A couple of years later Jardine and Selby described a new species, the chief difference being given as the form of the wing. All these names refer absolutely to the typical form, as did also another name proposed by Latham for a painting made by Watling.

However, when Gould received birds from the North-west of Australia he did not hesitate to determine them as different. In doing so he was undoubtedly correct, the only argument being the value of the difference, whether specific or subspecific.

The variation seen in the typical form caused misgiving as to the validity of Gould's second species by Australian ornithologists, and though it was maintained by Ramsay, he wrote: "Derby. This bird is very variable in its tints of plumage, especially on the upper-surface." And later: "Specimens from N.E. Australia and Derby are identical, and should be considered one and the same species, varying chiefly in colour, slightly only in size." When Hartert wrote the *Catalogue of the Birds in the British Museum*, Vol. XVI., he synonymised Gould's two species without detailed explanation, stating: "I cannot make out whether the female differs from the male or not, but the sexes are probably alike. Some specimens are darker, some paler; the characteristic markings of the head are often indistinct; in other specimens the pale parts of the head and breast are strongly tinged with rufous. As the rufous colour varies greatly, I am inclined to believe that it is independent of age and sex, and merely an individual character. The figures of *Ægotheles novæhollandiæ* and the supposed *Æ. leucogaster* in Gould's *Birds of Australia* are much exaggerated."

This was written when Hartert was depressed by the importance of the work, and his own necessity to conserve the traditions of the British Museum authorities.

Ten years later Hall received very rufous specimens from North-west Australia and, regarding them as a distinct species, named them *Æ. rufescens*, afterwards *Æ. rufa*.

Hartert, in the *Nov. Zool.*, Vol. XII., p. 216, 1905, having received a series of birds from North-west Australia, recorded them under the name "*Ægotheles novæhollandiæ* (? *leucogaster*)," observing: "When I wrote the catalogue of the *Podargidæ* in the British Museum (*Cat. B.*, XVI., 1892) I could not make out that two subspecies could be distinguished in Australia, but the material available was absolutely inadequate. I am now of opinion, from what I have recently seen, that it is, after all, possible that two forms, a more southern and

OWLET NIGHTJAR.

eastern, which I should call the true *novæhollandiæ*, and a more northern and western one, which would be *leucogaster* of Gould, can be distinguished. Recently Mr. Robert Hall has described as new a form from the Fitzroy River, first naming it *Æ. rufescens*; afterwards, having found out that the name *rufescens* was already used for another species, renaming it *Æ. rufa* (*Victorian Naturalist*, XVIII., pp. 60, 89, 1902). Locality and description suggest *a priori* that Mr. Hall's supposed new form (if different from *Æ. novæhollandiæ novæhollandiæ*) is Gould's *leucogaster*. The series now before me—*i.e.* the specimens collected by Mr. Tunney, some from Point Cloates collected by Mr. Tom Carter, and some from Northern Queensland—show beyond doubt that the rufous-cinnamon examples are not specifically different from the grey ones, for we have all intermediates between both forms from the same districts. Thus Mr. Hall created two new synonyms at once. The question only remains whether there are two subspecies; and I believe that one should distinguish the north-western ones as *leucogaster*, because they are mostly lighter and larger, and cinnamon examples are more frequently found among them. There is, however, no adequate series from S.E. Australia in England, and I must therefore again appeal to Australian ornithologists to settle the question. If they send me a good series from New South Wales, etc., I shall be glad to give my opinion. Mr. Hall has evidently most insufficiently studied the individual variation of the species, for several of his characters (as, for example, the number of bars on the tail!) are the most variable ones. A bird from Gracefield, Cranbrook (S.W. Australia), is a typical *novæhollandiæ*."

This criticism by Hartert was not a judicial one, and it was through his own fault in the British Museum Catalogue that Hall indicated his new species. As noted above, that Catalogue was not of the standard afterwards reached by Hartert, and it should have been apologised for when dealing with Hall's species, instead of which, apparent pity at Hall's ignorance is expressed. Note where he comments upon the barring of the tail as a character. Now refer to the *Catalogue of Birds*, Vol. XVI., p. 646, where he gave a "Key to the Species," and defined

- "A. Tail with 12 or more bars; markings on breast
and upper-parts finer *novæhollandiæ*.
- "B. Tail with 10 or less bars; pale markings above,
and dusky markings on breast broader and
less numerous *bennetti*."

Thus, it was Hartert's own *specific* character of barring of the tail that attracted Hall, and when Hartert indicated that it should be regarded as individual only, he did not state that, therefore, he had been in the wrong in using it *also* as a specific character. As a matter of fact, that "Key" is a

THE BIRDS OF AUSTRALIA.

crude affair, three species being omitted from it, and a footnote given: "*Æ. salvadorii* is larger than *Æ. albertisi* and less rufous. I have not seen *Æ. dubius* and *Æ. affinis*, and could not place them in the Key satisfactorily. Cf. description." *Æ. salvadorii* was there *described* by Hartert, and the wing is given as "4.6 to 4.8 inches," while on the previous page the wing of *Æ. albertisi* is given as "4.7 inches." I cannot read here any larger size. As to *Æ. dubius*, Hartert wrote: "Dr. Meyer has kindly compared the type with a specimen of *Æ. albertisi*; it is similar in size and proportions, but differs in the less rufous coloration."

In view of such an incomplete appreciation of the species, which was (p. 646) acknowledged by Hartert himself, when monographing the whole group, Hartert should have been more generous in his comments upon Hall's action.

When I drew up my "Reference List" (*Nov. Zool.*, Vol. XVIII., 1912), I examined the series and recognised four subspecies (p. 284)—

"*Ægotheles cristata cristata* (White). New South Wales, Victoria, Tasmania, South Australia, South Westralia.

Ægotheles cristata murchisoniana.

Differs from *Æ. c. cristata* in its pallid coloration, and from *Æ. c. rufa* in being still paler than that form, and lacking the dark coloration of the head. Type: East Murchison, West Australia, Mid Westralia.

Ægotheles cristata leucogaster (Gould). Northern Territory, North Queensland.

Ægotheles cristata rufa (Hall). North-west Australia."

After reconsideration these were maintained without any alteration in my "List of the Birds of Australia," published in 1913.

I now put forward a new arrangement based on more prolonged study, and here again find that Gould's two species agree well with the range of two super-races, which are noticeably different in many details of coloration. As a matter of fact these differ much more from each other than some of the New Guinea forms differ from the typical or from each other, and the latter have been recorded as distinct species. I will note details later.

From Sydney southwards and westwards along the coastal districts right to Perth, West Australia, a dark form is met with. There is noticeable variation as regards individuals, but with the present series no separative characters have been discerned, so that a single subspecies is here admitted as follows—

Ægotheles cristata cristata (J. White). New South Wales, Victoria, South Australia, South-west Australia.

These are dark greyish birds, with the under-parts closely freckled, and as

OWLET NIGHTJAR.

specimens become available it may be that subspecies will be herefrom separated.

All the birds from Tasmania are darker at sight, and therefore I separate these at once as a distinct subspecies, under the name

Ægotheles cristata tasmanica, subsp. n.

The type is a male collected at Prospect near Launceston, on March 15, 1901.

Throughout the ranges of these subspecies rufous birds are not common, and I have not yet seen one from Tasmania.

The North Queensland birds have been continually associated with the north-western form, but they are referable to the typical association. They would come between the New South Wales form and the South-east New Guinea "species" *Æ. bennetti* Salvadori and D'Albertis, described from Yule Island, off the coast.

This latter can only be regarded as a subspecies of *Æ. cristata*, the bolder markings on the breast and the larger bill being the only marked differences.

I propose to distinguish the North Queensland birds as a distinct subspecies, with the name

Ægotheles cristata olivei, subsp. n.

The type is a male collected at Cairns, North Queensland, in November, 1902, No. 1228 in my collection.

Robinson and Laverock, reporting upon birds collected by Olive at Cairns, N. Queensland (*Ibis*, 1900, p. 637), used as name "*Ægotheles novæhollandiæ*," but added: "Three specimens, with rufous auriculars, and the centre of the abdomen pure white, are evidently referable to *Æ. leucogaster* Gould, if that species is valid, which these specimens seem to show may be the case."

The back is more distinctly and boldly barred, while the tail-barring is more pronounced and recalls the New Guinea subspecies; the white belly separates the birds from the typical form, with which it agrees in size, and though slightly paler, it is not as pale as typical *leucogaster*. It has not the bold breast-markings nor broad bill of *A. c. bennetti* Salv. and D'Alb. The basis of work on the northern, north-western birds begins with Gould's *leucogaster*. The whiter under-surface is a striking feature when series are available, and I again give a big range for the subspecies.

Ægotheles cristata leucogaster (Gould). North-western Australia, Northern Territory.

It is almost certain that more than one subspecies is here confused, but no characters have been grasped by examination of the birds now before me. There is variation in both the red and grey phases, but both are paler than the corresponding southern forms. The freckling on the back sometimes shows as regular barring, and the markings on the breast are more or less

THE BIRDS OF AUSTRALIA.

bolder, but these variations have not been connected yet with geographical ranges. Whether a red phase occurs at all at Port Essington is quite doubtful, while its predominance on the north-west coast is exactly in accordance with the facts collected by the distribution of *Ieracidea berigora*. It will be again noticed how the distributional features of the forms of *Ieracidea* are confirmed by so many other distinct groups. Thus Hall noted the rufous phase on the north-west and determined it as a distinct species. It occurs more commonly there than on any other coastal district, though generally the reddish coloration is associated with inland conditions. I cannot, however, at the present time distinguish definitely between the birds ranging from Derby to Alexandra, Northern Territory, so that I do not recognise Hall's *rufa*, but should the Port Essington birds (when a good series can be compared) prove subspecifically distinct, then Hall's name would be valid for the other form.

I separated the East Murchison form as being paler than the rufous phase of "*rufa*," and it is here maintained:—

Ægotheles cristata murchisoniana Mathews. Mid Westralia.

Only rufous birds have been seen from this locality, and it seems certain that grey birds, if they occur at all, are very rare in the interior districts.

When Captain S. A. White wrote up the account of his Expedition into Central Australia, in 1913, he recorded (*Trans. Roy. Soc. South Austr.*, Vol. XXXVIII., 1914, p. 428): "*Ægotheles* (?) (Owlet Nightjar). We procured a very reddish species of this bird and, owing to the lack of material for comparison, have been unable to make sure of its identity, but have forwarded specimen to Mr. G. M. Mathews, of England, for his opinion."

He also sent me the following note: "The Coastal form of this bird is of a uniform colour, grey with dark markings, showing little or no rufous markings, but the Interior bird is a puzzle. I have often thought there are two forms found there, one a grey with darker markings somewhat like the Coastal bird, while others are more or less coloured with rufous, and the latter bird seems to be somewhat smaller. A bird taken during our Central Australian Expedition in 1913 and sent to you resembled *Æ. c. rufa*, yet the dark bird was found in the same district. I do not see why it is not possible for there to be two forms in the Interior. The species lays from three to five eggs, white and almost round, on the decayed wood of a hollow limb or spout. The birds roost during the daytime in hollow spouts, and when disturbed will fly to the nearest tree, and seem to see well in the daylight. Their call at times is low and soft, at others a shrill squeak like an insect. Their food consists of nocturnal insects. The young covered in soft white down. I have found it as far north as I have been, and it is widely distributed over South Australia."

OWLET NIGHTJAR.

After careful criticism I have determined to differentiate this race under the name

Ægotheles cristata centralia, subsp. n.

The type is a male, collected at Stevenson's River, on October 5th, 1913. It is more rufous than any other red bird, but the back is boldly barred with dull blackish: the throat and upper-breast are very rufous, this colour extending on to the flanks and across the abdomen, where there is scarcely any white, though the under tail-coverts are white.

There still remains to be considered a series collected on Melville Island. These are apparently closer to the south-eastern birds than to the north-western specimens, showing dark upper coloration and also less white on the under-parts, the markings on the upper-surface also being bolder. No red specimens at all were met with. In addition, the series give larger measurements than the typical series do, the wing in males averaging 136 mm., in females 133 mm., indicating that the former may be slightly larger than the latter. The wing in south-eastern series averages 127 mm. in males, 125 mm. in females.

I propose for the Melville Island race

Ægotheles cristata melvillensis, subsp. n.

The type is a male, collected on Melville Island on January 6th, 1912.

No New Guinea forms have been considered as subspecies of the Australian species, and recently Ogilvie-Grant wrote in the Jubilee Supplement, No. 2, of *The Ibis* as if there were little relationship between them. This was due to the prevalent idea among old-world ornithologists that "Australia" was an ornithological locality comparable in extent with any small island of the Moluccas. It should be emphasised that the tail-barring, utilised by Hartert to differentiate the New Guinea *bennetti*, is not an invalid feature; but that the tail-barring of North (West) Australian birds is much more distinctive when these are compared with typical specimens, notwithstanding Hartert's comments in connection with Hall's consideration of this character.

The form *A. bennetti* from South-east New Guinea must be called

Ægotheles cristata bennetti Salvadori and D'Albertis.

It is probable that Ogilvie-Grant would have assisted science had he, when dealing with New Guinea *Ægotheles*, reviewed the whole of the "species," as there appears to be much confusion. The New Guinea forms are separated in literature by characters which are completely ignored as individual when Australian birds are examined. Yet Australia is a bigger place and with more faunas than New Guinea. It is, therefore, probable, as Hartert suggested twenty-five years ago, that "several of these (the New Guinea)

THE BIRDS OF AUSTRALIA.

forms may not stand as distinct species when our knowledge of this genus has increased."

An interesting bird may be here noticed. Layard and Tristram described a single specimen from New Caledonia as *Ægotheles savesi*. It is much larger and much darker than the Australian typical form but is of that affinity. I would recall that the Tasmanian bird is also darker, but does not appear to have noticeably increased in size; while the Melville Island form is also darker than that of the mainland and is also appreciably bigger. It is thus apparent that in this genus island forms are generally darker and larger, conforming to a common rule in connection with island subspecies.

GENUS—EURYSTOMUS.

EURYSTOMUS Vieillot, Analyse Nouv. Orn., p. 37, April,

1816 Type *E. orientalis*.

Colaris Cuvier, Le Règne Animal, Vol. I., p. 401, Dec.,

1816 Type *E. orientalis*.

Also spelt—

Collaris Selby, Cat. Gen. Subgen., Types Aves, 1840, p. 35, notes.

CORACINE birds with bills broad at base rapidly narrowing to a sharp point, long wings, square medium tails and small legs and feet.

The bill is depressed, broadly triangular, not keeled, although the culmen ridge is pronounced, tip strongly hooked, laterals flattened, edges sinuate.

The lower mandible is narrow, the rami thin and perpendicular, the interramal space short and broad, the tip slightly decurved and emarginate.

The nostrils are placed near the base of the bill and are hidden by bristly feathers.

The wing is long, the second primary longest, the first about equal to the third, which slightly exceeds the fourth, these primaries forming the tip of the wing.

The tail is of medium length, square and about half the length of the wing; the feathers broad and twelve in number.

The legs and feet are small: the tarsus very short, less than half the length of the middle toe: covered with scutes in front and finely reticulated behind. The toes are of medium length, the outer toe scarcely united to the middle, the inner joined for the length of the basal joint. Claws long, middle claw very long, hind claw short.

EURYSTOMUS ORIENTALIS.

ROLLER, OR DOLLAR BIRD.

(PLATE 331.)*

Coracias orientalis Linné, Syst. Nat., 12th ed., p. 159, 1766 : India.*Coracias pacifica* Latham, Index Ornith. suppl., p. xxvii., 1801 : New South Wales.

Pacific Roller Latham, Gen. Synops., Suppl. II., p. 371, 1801.

Coracias pacifica Latham, Index Ornith. Suppl., p. xxvii., 1801.*Galgulus pacifica* Vieillot, Nouv. Diet. d'Hist. Nat., Vol. XXIX., p. 435, 1819.*Eurystomus orientalis* Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 202, 1827.*Eurystomus australis* Swainson, Anim. in Menag., p. 326, Jan. 1838 : New South Wales ; Gould Birds Austr., pt. xii. (Vol. II., pl. 17), 1843 ; Diggles, Ornith. Austr., pt. 5, pl. 22, 1866 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 36, 1892 ; Hall, Key Birds Austr., p. 56, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 544, 1901 ; A. G. Campbell, Emu, Vol. II., p. 16, 1902 (Vic.) ; Le Souëf, *ib.*, p. 150, 1903 (N.T.) ; Berney, *ib.*, p. 210, 1903 (N.Q.) ; *id.*, *ib.*, Vol. IV., p. 45, 1904 (N.Q.) ; *id.*, *ib.*, Vol. VI., p. 43, 1906 (N.Q.) ; Austin, *ib.*, Vol. VII., p. 31, 1907 (N.S.W.).*Eurystomus pacificus* Gray, Annals Mag. Nat. Hist., Vol. XI., p. 190, 1843 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 168, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 119, 1865 ; Ramsay, Ibis, 1866, p. 327 (Q.) ; *id.*, Proc. Zool. Soc. (Lond.), 1875, p. 582 (Q.) ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878 ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; Robinson and Laverock, Ibis, 1900, p. 638 (Q.) ; Sharpe, Hist. Coll. Nat. Hist. Brit. Mus., Vol. II., p. 119, 1906 ; Mathews, Handl. Birds Austr., p. 53, 1908 ; Ingram, Ibis, 1908, p. 466 (N.Q.) ; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 346, 1909 ; Mathews, Emu, Vol. IX., pp. 6/58, 1909 ; *id.*, Vol. X., p. 109, 1910 (N.W.A.) ; Campbell and White, *id.*, p. 196 (N.Q.) ; Broadbent, *id.*, p. 234 (N.Q.) ; G. F. Hill, *id.*, p. 270, 1911 (N.W.A.) ; Barnard, *ib.*, Vol. XI., p. 23, 1911 (N.Q.) ; G. F. Hill, *ib.*, Vol. XII., p. 255, 1913 (N.T.) ; Macgillivray, *ib.*, Vol. XIII., p. 159, 1914 (N.Q.) ; Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.) ; Cheney, *ib.*, p. 207, 1915 (Vic.) ; H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.).*Eurystomus orientalis pacificus* Mathews, Nov. Zool., Vol. XVIII., p. 284, 1912 ; *id.*, List Birds Austr., p. 144, 1913.* The Plate is lettered *Eurystomus pacificus*,



Roland Green, del.

Witherby & Co

$\frac{5}{3}$
EURYSTOMUS PACIFICUS.
(*AUSTRALIAN ROLLER*).



ROLLER, OR DOLLAR BIRD.

Eurystomus orientalis bravi Mathews, Nov. Zool., Vol. XVIII., p. 285, 1912: Parry's Creek, North-west Australia; *id.*, List Birds Austr., p. 145, 1913; *id.*, South Austr. Ornith., Vol. III., p. 72, 1917 (N.W.A.).

DISTRIBUTION. Queensland; New South Wales; Victoria; Northern Territory; North-west Australia (Lord Howe Island).

Adult male. Crown of head, sides of face, sides of neck, hind-neck and upper mantle dark earth-brown, the feathers slightly edged with blue on the last—the blue increasing in extent on the scapulars and innermost secondary-quills, which are abraded and brown at the tips; upper wing-coverts greenish-blue; bastard-wing, primary-coverts and outer aspect of the primary- and secondary-quills deep ultramarine blue, the inner-webs blackish, a band of very pale blue across the primary-quills commencing on the inner-web of the outer feather and disappearing on the outer-web of the eighth; lower back, rump, and upper tail-coverts dull greenish-blue, as is also the base of the tail, which is deep ultramarine-blue on the apical portion, the shafts horn-colour at the base; loreal space and eyelids black; throat and fore-neck dusky-grey, with glistening blue shaft-lines to the feathers, becoming bluish-green on the breast where the shaft-lines disappear; remainder of the under-surface, including the abdomen, under tail-coverts, sides of body, axillaries, and under wing-coverts pale blue; quills below blackish, with more or less blue at the base and a very pale blue patch on the primaries; lower aspect of tail blue at the base and blackish on the terminal half. Eyes brown, feet and tarsus red, bill red, tip of upper mandible black. Total length 280 mm.; culmen 24, wing 193, tail 91, tarsus 22. Figured. Collected on Parry's Creek, North-west Australia, on November 2nd, 1908.

Adult female. Similar to the adult male, but everywhere duller.

Immature. Dull all over; as they get older the parts that in the adult are blue in the young are greenish.

Nest. A hole in a tree.

Eggs. Clutch, three to five. White, 34-36 mm. by 27-28.

Breeding-season. October to December.

AFTER Latham had worked through the "Watling" drawings and described so many Australian birds in the *Second Supplement to the General Synopsis of Birds* he included a number of "Additions" on pp. 368-376. In connection with the first species he wrote: "Inhabits China; for this, and many of the following, I am indebted to General Davies." Nearly all those additions were Australian species, and, moreover, a number were from Norfolk Island, though this locality is erroneously given in connection with some of the species.

However, on p. 371 is described the "Pacific R(oller). Length nine inches; bill and legs red; head and neck chesnut; chin and throat, down the middle, black, bounded on each side with a line of white; the lower part of the neck from the chesnut changes to green, and from thence all beneath is paler green; wings fine blue; base of the quills white, forming a spot of white when expanded; rump and tail-coverts green; tail itself, and ends of the quills dusky blue-black. Inhabits Port Jackson."

THE BIRDS OF AUSTRALIA.

The Latin name *C(oracias) pacifica* was given on p. xxvii. of the *Supplement Index Ornith.*

This name was ignored until Gray, in 1843, recognised the painting and accepted Latham's name. Previous to this recognition Swainson had separated the Australian bird from the Indian one, under the name *Eurystomus australis*, and this name was used by Gould in the *Folio Birds of Australia*. True to his rigid adherence to strict priority, this name was displaced in the "Handbook" by the better name *Eurystomus pacificus*. When Sharpe monographed the Rollers, in the *Catalogue of the Birds in the British Museum*, Vol. XVII., 1892, he rejected the latter name, using *Eurystomus australis* again, explaining: "The description is so inaccurate that it is impossible to identify it with the Australian Roller." Later, when he examined the Watling paintings, he admitted that the painting did represent this bird, and therefore withdrew his opposition and accepted as the correct name *Eurystomus pacificus*.

Vigors and Horsfield, in the *Trans. Linn. Soc. (Lond.)*, Vol. XV., p. 202, 1827, gave the following account: "In Mr. Caley's MSS. are the following notices of this bird: "Its native name is *Natay'kin*; the settlers call it *Dollar Bird*, from the silver-like spot on the wing. It is a noisy bird when on the wing, but mostly so in the evening, after other birds have gone to roost. It may then both be heard and seen on the tops of trees, particularly on dead branches, where it is most easily shot by so exposing itself. Its flight is much like that of the *Swallow*, but I have never observed it long upon the wing, as it generally betakes itself, as I before mentioned, to the top of some high tree or decayed branch, from whence it darts more readily upon its prey. At this time (the evening) the Beetles, which I have found in their stomachs, are upon the wing. It is a bird of passage. The earliest period of the year at which I have noticed it was on the 3rd of October, 1809; and I have missed it early in February. It is most plentiful about Christmas."

They continue: "This bird, which seems to spread itself very generally over the Eastern world, was originally placed by Linnæus among the *Rollers*, or his genus *Coracias*; and although it has latterly been formed into a distinct genus from that group, it has still been arranged next to it by the greater number of systematic writers." They strongly dissented from that classification, but I do not see any reason for their conclusion, and it does not appear to have been considered by any recent systematist. They suggested that the habits above recorded agreed with their conclusions, but they seem to be of a negative character. Hereafter, I give most of the recent life-history, and it will be considered by the serious student to be of

ROLLER, OR DOLLAR BIRD.

little value in the consideration of the relationships of the species, the chief theme being resettings of the above.

Gould's notes on this species are full and interesting, and are here quoted : "In Australia the Roller would appear to be a very local species, for I have never seen it from any other part of the country than New South Wales ; but the late Mr. Elsey informed me that he found it very common in the Victoria basin, and that it became very numerous about the head of the Lynd. It arrives early in spring, and, after having brought forth its progeny, retires northwards on the approach of winter. It appeared to be most active about sunrise and sunset ; in sultry weather it was generally perched upon some dead branch in a state of quietude. It is a very bold bird at all times, but particularly so during the breeding-season, when it attacks with the utmost fury any intruder that may venture to approach the hole in the tree in which its eggs are deposited. When intent upon the capture of insects it usually perches upon the dead upright branch of a tree growing beside and overhanging water, where it sits very erect, until a passing insect attracts its notice, when it suddenly darts off, secures its victim, and returns to the same branch ; at other times it may constantly be seen on the wing, mostly in pairs, flying just above the tops of the trees, diving and rising again with many rapid turns. During flight the silvery-white spot in the centre of each wing shows very distinctly, and hence the name of Dollar Bird bestowed upon it by the colonists. It is a very noisy bird, particularly in dull weather, when it often emits its peculiar chattering note during flight. It is said to take the young Parrots from their holes and kill them, but this I never witnessed ; the stomachs of the many I dissected contained the remains of Coleoptera only . . . The sexes are alike in plumage."

Captain S. A. White writes : "I have only met with this bird in New South Wales, where it delights to sit on the topmost branch of a dead tree ; have often seen them hawking for flying insects from their elevated perch."

Mr. Edwin Ashby has written me : "I met with this bird in the Blackall Ranges about 70 miles North of Brisbane. The bird used the bare bough of the tallest trees as a sort of look-out, and from that point of vantage was hawking after insects. I have never seen this bird in South Australia, and specimens I received from Port Keats, Northern Territory, measure much smaller than those collected in Southern Queensland."

Mr. Thos. P. Austin has written me from Cobbora, New South Wales : "Dollar Birds usually arrive here early in October, and always resort to the same favoured locality to breed, but I cannot remember ever having seen them nesting a second time in the same hollow, but I have once known them to return to the same tree for this purpose, but used another hollow. They prefer

THE BIRDS OF AUSTRALIA.

to live much of their life in the topmost branches of the tallest tree growing along the banks of rivers and creeks, and, if available, usually perch upon a dead branch. Suddenly they will dart into the air, apparently after some passing insect, then most probably will return to the same perch they had just left, but I think very often these quick, short, jerky flights are sometimes in a form of play, more especially when two or more birds go up together; at these times they are very noisy, and their notes are somewhat resembled by several of their blown eggs being rubbed quickly together, but, of course, their notes are very much louder. They must be very quick at hearing, as they often leave their nests at the least sound of approaching danger, but I have known them to refuse to flush even when a rifle bullet has been fired into the hole. They usually resort to rather high trees for nesting: I have seen them seventy feet or more, but never less than forty. They build no nest, simply laying their eggs upon the decaying wood. The clutch is usually four, and of all the nests I have examined containing eggs one was in December, all the others in November, but none before the second week, so in this district they are most regular in their nesting habits. I once saw an albino."

Mr. J. W. Mellor sent me the following: "The Dollar Bird is by no means rare in New South Wales and Queensland, if the right kind of country is sought out for observing its peculiar habits: it loves the thickly timbered parts, and especially where the trees have been 'rung,' and are standing like gaunt giant ghosts, can the Roller be seen to advantage: here are hollows for it to live in the heat of the day, and come forth towards night and capture its insect food in the clear spaces between the trees; it generally starts feeding late in the afternoon, sailing from one dry tree to another, capturing the insects on the wing, and only resting a moment or two ere it goes on again in pursuit of more food. I have seen them plentiful in the forest and scrub country about the Tuggerah Lakes, between Sydney and Newcastle, New South Wales, in December, 1904, and I also saw them in the Blackall Ranges, Queensland, where they occupied the same localities as in New South Wales. These birds are not altogether night birds, although they can see well in the dusk of the evening, but also move about in the daytime if not too hot. I saw some of them flying overhead at the Capricorn Islands early in November, 1910: they had in all probability come from the mainland, and were living in the thick scrub on the islands for the time being."

Mr. F. E. Howe has sent me the following: "I have only met with this bird in the flesh once, and that was at Ferntree Gully, Nov. 8, 1908. Mr. Mattingley discovered them sitting high up in a tall and dead white gum. We wished to secure them, but were without firearms. I remembered that my brother and party were to have camped close by, and hunting about we

ROLLER, OR DOLLAR BIRD.

found them. He had a pea-rifle and quickly brought one of the birds down, dissection proving it to be the male. It measured $11\frac{1}{4}$ inches in length; the bill was reddish orange, feet red, irides dark-brown. When sitting on the limbs of the tree the male would fly to the female and caress her by rubbing his bill about her head, and uttering the while very discordant and harsh notes, not unlike a 'song.' When shot he showed fight right to the last (he was shot in the wing only). As he fell the female escaped, and, although we hunted the timber for a full half hour could not find her. However, she was shot by my brother from the same tree the next day, and is now in the collection of Mr. Chandler, Jr. When the female was dissected the eggs were found to be about half the size of a pea, and they wouldn't have been laid for quite a month. The nest is placed in a hollow of a tall tree, and the eggs are pearly white and very glossy."

Mr. A. G. Campbell has written me: "These birds nest as far south as the Murray River near Corowa, and the Goulbourn near Seymour, preferring large holes in red gum trees."

In the *Emu* (Vol. II., p. 210, 1903) Berney wrote: "During the summer of 1900-1901 the Roller was plentiful about Homestead, on the Campaspe, where they commenced arriving on 20th October. By the 3rd November their queer chattering could be heard everywhere. Towards the end of the following March they got scarce, and I have a note that I heard one on the 20th April, but did not remember to have done so previously for two or three weeks. Out west they are scarce, and I have only met with it three times in four years, twice about Richmond and once at the head of the Landsborough, in January and March respectively, the latest date being the 22nd of the latter month."

The next year (*Emu*, Vol. IV., p. 45, 1904) he added: "Arrives in these parts in October, my earliest record being the 7th, in 1902. In the years 1903 and 1904 they have been all gone by end of first week in April. In my previous notes I stated that they were scarce out west, but my experience then had been confined to the open downs country, which these birds avoid. As a matter of fact, they may be seen or heard any summer's day among the big gums on the Flinders River, from Hughenden down."

This was supplemented in Vol. VI., p. 43, 1906, as follows: "This species is a summer visitant in considerable numbers; arriving in October, it leaves again in March or April . . . The feet are light and small, weak-looking for the size of the bird. The red bill has an opaque, candle-wax appearance, and a pronounced black hook at the extremity."

Le Souëf, describing birds' eggs from Port Darwin, Northern Territory (*Emu*, Vol. II., p. 150, 1903), gave the following item: "These birds soon

THE BIRDS OF AUSTRALIA.

attract one's attention when in their neighbourhood, not only by their notes, but also by their curious antics when on the wing and their habit, if disturbed when nesting, of darting into holes in trees, apparently to mislead the intruder as to the hollow in which their eggs really are. They make no nest, the eggs being placed on the decayed wood at the bottom of the hollow."

In the *Emu* (Vol. IX., p. 6, 1909) J. P. Rogers' notes were given as follows: "Parry's Creek, North-west Australia. First arrived here on 9th September. Their favourite resting-place is the topmost branch of a dead tree. They always keep near a creek or water-hole. As a rule they are noisy. They are scattered along Parry's Creek every half mile or so, and they always keep near the same spot. I have sent my black boy up several trees, but so far have found no nests. The stomach of one killed contained a quantity of cockchafers, which were crushed and swallowed whole."

Miss Cheney, of the Wangaratta District, Victoria, recorded (*Emu*, Vol. XIV., p. 207, 1915): "Locally, this was known as the 'Rain Bird.' Sometimes its arrival was coincident with bad weather, to give colour to the saying. It was often shot and brought to me as 'probably the only bird of its kind in Australia.' Sometimes people sent in a more or less incorrect description of it to the newspapers, and there was a little excitement about it. It was fairly common, but, owing to its frequenting the tops of tall trees, not often seen, unless people heard its raucous note."

Campbell, in his *Nests and Eggs* (Vol. II., p. 545, 1901), tells a story which is worth quotation: "Mr. Herman Lau wrote: 'It was in the month of September I detected the breeding-place of a Roller about sixty feet from the ground in the knob hole of a very stout and tall eucalypt, near the McIntyre Brook, at Whetstone. Seeing the bird flying in and out, I waited for a week before sending up an *aborigine* to make sure that eggs were deposited. With great reluctance, and under promise to give him a linen coat and trousers, half a bottle of rum in addition to a glass before starting, I persuaded my climber to the task, also promising to be in readiness with my gun to shoot the birds in case they should attack him while taking the eggs. Now, on the way up there was a portion of a thick barrel, and to overcome this I provided him with four 6 in. nails to insert in the tree, for placing his big toe on. Just being in this act, both birds descended, sat soon amongst his black hair, pecking away, at the same time uttering their low-toned noise. Although my blackfellow was crying out "Shoot 'em, shoot 'em!" I waited until they left him. Both birds were shot. I found a complete egg in the female; my man taking three more out of the hole, completed the clutch (four).'"

ROLLER, OR DOLLAR BIRD.

Mr. J. P. Rogers, when at Parry's Creek, North-west Australia, once witnessed a fight, and his description seems worth recording: "Two of these birds were fighting, and a third looking on. There appeared to be two males fighting for a female. The fighters did not chase each other, but when one settled on a tree the other flew at it, laid hold of it with its bill and pulled it off its perch. (There was no sparring for a hold, just a 'head down' rush in.) Both birds would then fall to the ground, still holding on to each other, with wings rigidly expanded and tail opened; these acted as a parachute, and they fell gently to the ground spinning round and round and keeping a perfect balance as they fell. On reaching the ground they seemed to fight on for a few seconds and would then fly up into a tree; this was done many times, the birds keeping up an incessant chattering during the fight. Eventually one flew away, and the other two settled down on a limb side by side."

H. L. White published McLennan's notes in the *Emu* (Vol. XVI., p. 219, 1917) as follows: "King River—Fairly numerous on the flats till after the first rains. 25/12/15. Nest containing two small young, examined. Roper River, 19/2/16. Couple of birds noted. Stomach, remains of insects and wasp."

In the *Catalogue of the Birds in the British Museum*, Vol. XVII, Sharpe recognised *Eurystomus australis* as a distinct species from *E. orientalis*, writing: "Similar to *E. orientalis*, but everywhere paler, especially on the upper-surface, which is brownish on the mantle and back, slightly washed with green; the under-surface of the body also is much greener; the outer webs of the tail-feathers blue nearly to the ends." As habitat he gave: "Australia, occasionally reaching to New Zealand. Throughout the Moluccas to Celebes"; and then added: "Intermediate specimens between *Eurystomus orientalis* and *E. australis*" from Negros, Philippines, and Ayala, Mindanao.

Working with birds from the islands north of Australia, Hartert relegated *australis* to subspecific rank in connection with *orientalis*.

This seemed natural, and when I prepared my "Reference List" (*Nov. Zool.*, Vol. XVIII., 1912) I accepted this rank, but also added (p. 285)—

"*Eurystomus orientalis bravi*."

Differs from *E. o. pacificus* in being paler below.

North-west Australia."

In my "List," 1913, pp. 144/5, I maintained these two subspecies, but I do not here recognise them. I have examined long series of these birds, and so much variation is apparent that I cannot delimit the subspecies. All the characters mentioned by Sharpe are variable, and that worker wrote: "Adult female. Similar to the male in colour." I find that the female is much duller and paler throughout, and this, in conjunction with the migratory

THE BIRDS OF AUSTRALIA.

habits of the species, confuses. Thus, if specimens are selected from different localities they are commonly quite different in shade, and look like distinct subspecies, but series at present do not uphold the differences. I do not say that later subspecies may not be easily characterised, but at the present time I cannot diagnose such. Ashby (p. 73) considered Northern Territory birds smaller.

However, the Australian birds are paler throughout than typical *orientalis*, and as the subspecific name *pacificus* is the oldest one, after the typical subspecific, our present nomination is quite accurate. Its range outside Australia I have not determined; New Guinea birds are commonly allotted to our form, which is also recorded generally in Moluccan catalogues. Specimens I have seen, however, differ appreciably, so that I am unable to state exactly that these are referable to our subspecies, though from the geography of these places our migratory birds should reach there. At present we have no idea of the migration routes of Australian birds.

Since this was in print Dr. Macgillivray has told me that the birds from Lloyd's Bay migrate direct north in a distinct line, not passing through Cape York. This fact necessitates revision of all the commonly accepted ideas concerning Australian migratory birds.

ORDER—ALCEDINIFORMES.

SUPERFICIALLY the Kingfishers form a well-marked group of a very distinctive character. Attractive in coloration and generally in shape, though this is of special evolution, they served for the first Monograph prepared by R. B. Sharpe, afterwards Dr. Bowdler Sharpe of the British Museum. Previously the famous Kaup had monographed them, and later Sharpe prepared the *Catalogue of the Birds in the British Museum* dealing with these birds. In that Catalogue (Vol. XVII.) the suborder Halcyones included four families, the *Alcedinidæ*, *Momotidæ*, *Todidæ* and *Coliidæ*.

I only deal with species grouped in the first "family," the others being unrepresented in the Australian Avifauna.

Sharpe's family was subdivided into two subfamilies as follows—

"Bill long and slender, compressed and perceptibly
keeled. Habits mainly piscivorous *Alcedininæ*.
Bill more or less depressed; culmen rounded, or
flattened, sometimes even grooved. Habits
mainly insectivorous or reptilivorous *Daceloninæ*."

Such definitions are comparatively valueless, as the student would never consider the bill of *Dacelo*, the type of *Daceloninæ*, as depressed were he not advised to do so in the above. The habits would be a bad key to family rank, though they might be considered in conjunction with other features when genera are being utilised. The culmen keeling would appear to be also an uncertain feature.

According to Sharpe, the only Australian member of the typical subfamily would be *Alcyone*, but he allotted *Ceyx* to the other subfamily, which seems quite unnatural.

In his Synopsis to the families he wrote:—

"Bill not serrated; cæca none *Alcedinidæ*.
Bill serrated; cæca none *Momotidæ*,"

and then among the members of the *Alcedinidæ* he cited a genus with "Tomia serrated."

It is obvious, therefore, that emendations were inevitable, but these have been long delayed through Sharpe's high authority. Further genus-lumpers have been generally content to accept the associations, though the first survey

THE BIRDS OF AUSTRALIA.

of the species grouped together in some cases indicated the heterogeneous content of the "genera."

In Australia we are not much concerned in this matter, as the species represented are of such diverse forms that for the ten species recognised five genera were allowed by genus-lumpers. With the genus-splitting methods I utilised in my "List" only seven genera were determined, and it was only necessary to propose one new one, the others having been created more than fifty years previously. Most of the details will be given in their places in connection with the genera concerned.

In the *Bulletin of the American Museum of Natural History* (Vol. XXXI., pp. 239-311, 1912) W. de W. Miller furnished "A Revision of the Classification of the Kingfishers." The main feature in the preparation of this article was, of course, the classification of the American species, but a review, as far as material was available, was made of the whole of the group.

As one result, considering the Kingfishers as one Family, instead of the two subfamilies Sharpe admitted, three subfamilies were recognised. Miller concluded: "The separation of the genera of the *Alcedo-Myioceyx* group in two subfamilies is, in my opinion, altogether artificial and unnatural. The close interrelationship of all these genera is indicated by their strong mutual resemblances in size, colour, and form (particularly the dorsal feathering, the very short tail, and the proportionate length of the toes), and it is quite evident that the breadth of the bill alone is insufficient for more than generic definition. Furthermore, the two groups are nearly, if not quite, connected by certain species of *Ceyx* and *Alcyone*, while *Ispidina leucogaster* is said by Sharpe to approach *Corythornis*. These seven genera, *Alcedo*, *Corythornis*, *Alcyone*, *Ceyx*, *Ceycopsis*, *Ispidina* and *Myioceyx*, taken together, appear to be sufficiently well characterised to form a subfamily of their own, combining to some extent certain characters of the two other subfamilies, but possessing several peculiar to this group."

Definitions were then given of the subfamilies, but these serve best to show the convergence manifest throughout this group, as it is certain that many cases of apparent relationship are due to this cause. Even as Sharpe, who was not a constant supporter of colour-values as of generic import, utilised colour-pattern, so does Miller, both constantly quoting coloration alone as of great importance. Thus Miller gives as a leading feature of the subfamily *Alcedinidæ*: "Crown barred or spotted with blue." This subfamily he diagnoses as "Small, very short-tailed Kingfishers, with all the feathers of the dorsal tract elongated, the second toe very short or absent, the orbital process of the quadrate practically wanting (the last character possibly inconstant)." He then gave Characters of Subfamilies in Detail. Therein

ALCEDINIFORMES.

are very many details given, few, if any, being of great value alone, but on the whole worthy of consideration. It is characteristic of these extra-Passeriform groups that minute features are grasped and developed as of subfamily rank, while they are denied in the Passeriformes even subgeneric value. Throughout the "characters" items are considered which would scarcely be mentioned if these had been Passeriform birds. Coloration is quoted in detail, not as colour-pattern, but as relative, though it must be admitted that really colour-pattern is concerned in this group with relative coloration. A quaint conception of ideas is expressed thus: "The osteological characters are presumably rather uniform throughout the group, but, unfortunately, I have had for examination only the skull of *Alcedo ispida*." The reasoning shown in this statement is inexplicable.

The rest of the Kingfishers, save the "old" genus *Ceryle*, are classed together in a subfamily *Daceloninae*, and the diagnosis of this group is even more complex than the diagnosis of the preceding *Alcedininae*. *Halcyon* is noted as providing exceptions, but *Halcyon* as used by Sharpe is not homogeneous. This is recognised by Miller, but material was not present and interest lacking to indicate the faults in Sharpe's grouping by generic separation. Attention is continually drawn to the discrepancies by such statements as the following: "In all others except *Halcyon*." "The wing is usually decidedly rounded. In some species of *Halcyon* the tenth primary is as long as the ninth, these two quills being the longest, but in all other genera the outermost quill is shorter than the fifth, usually conspicuously so, and shorter than the fourth in all but *Todirhamphus* and *Dacelo*." "The variation in the primary formula in *Halcyon* is most remarkable," etc. I will deal more with the species of "Halcyon" later under the genus name *Cyanalcyon*. It must be understood that the above remarks are not put forward in any way in disparagement of Miller's work or conclusions, both of which I strongly approve, but merely to show that there is still much to be done in the matter from an extra-American point of view. As instance, Miller lists the species of which he examined skins and skeletons, and among the latter *Dacelo gigas* is the only Australian representative. He also states: "The natural grouping of the genera in the *Daceloninae* is a matter of considerable difficulty, and no arrangement can be considered final until the internal anatomy has been examined." I quite agree with this, as the relationship of the *Dacelonine* species referred to "*Halcyon*" certainly needs careful consideration.

GENUS—ALCYONE.

ALCYONE Swainson, Classif. Birds, Vol. II., p. 336, 1837

(July) Type *A. azurea*.

Also spelt—

Halcyone Agassiz, Index Univers., p. 491, 1848.

MEDIUM Alcedinine birds, with very long bills, long wings, very short tails, and small feet, with three toes only.

The bill is very long, straight and pointed, compressed laterally, tips succeeded by slight notch, mandibular edges entire. The culmen ridge distinct, flattened, separated by an obscure groove from the laterals, which are steep but slightly outcurving. The lower mandible of similar formation throughout. The nostrils appear as horizontal slits, situated at base of bill midway between culmen ridge and lower edges of upper mandible.

The tail is square and very short, less than half the length of the wing, and almost hidden by upper tail-coverts.

The legs and feet are very small. The tarsus is very short, the podotheca complete, no scutes or reticulation being present.

There are three toes only; the two fore toes being connected, all save the first joint, the outer toe shorter than the other, which is the middle toe, the inner toe being missing: the hind toe is comparatively long: claws long and curved, but not pectinate at all.

The genus *Alcyone* was proposed by Swainson for the Australian Kingfisher *azurea*, which was similar to the European *Alcedo* but had only three toes. *Ceyx* of Lacépède he placed as a subgenus of *Halcyon*, writing: "Bill and general structure of *Dacelo*; but the inner fore toe is wanting." Obs. "This type I have never seen." I have not yet traced who was the responsible systematist in the perpetuation of such a classification, but it seems that G. R. Gray accepted Swainson's classification, and, further, that he separated the above into different subfamilies. Thus he placed the genus *Ceyx* in the subfamily *Halcyoninae*, and the genus *Alcyone* in the subfamily *Alcedininæ*. Bonaparte, in the "Conspectus," used the subfamily name *Daceloninae*, according to priority, and therein placed the genus *Ceyx*, naming as species *tridactyla* L., *purpurea* Gm., *rufidorsa* Strickland, *melanura* Kaup, and *lepida* Temm. In the subfamily *Alcedinidæ* he recognised the genus *Alcyone*, with the species *solitaria* Temm., *pusilla* Temm., *cyanipectus* Lafr. and *azurea* Lath. The three former had been described as species of *Ceyx*.

ALCYONE.

It is unnecessary to note other systematic workers in the present case until Sharpe completed his work in the *Catalogue of the Birds in the British Museum*. Therein he continued the separation of the genera *Alcyone* and *Ceyx* into different subfamilies, in the former genus classing *azurea*, *pulchra*, *lessoni*, *affinis*, *pusilla* and *richardsi*. Under the latter *Ceyx* he recorded eighteen species, including *solitaria* and *cyanipectus*, classed by Bonaparte in *Alcyone*.

The relationships of the small species will be discussed under the succeeding genus *Micralcyone*, so it may here be noted that *Alcyone* is restricted to the species *azurea*, of which I consider *pulchra*, *lessoni*, and *affinis* simply subspecies. Why *pusilla* was classed in *Alcyone* in preference to *Ceyx* I have not yet been able to determine, but it is possible that anatomical study will give us clues to the affinities of the species of this Order. Similarity in design as regards superficial characters tends to obscure these, so that it is quite possible we are associating species of diverse origin, and anatomical research might make clear such mistakes.

Order *ALCEDINIFORMES*.

No. 384.

Family *ALCEDINIDÆ*.

ALCYONE AZUREA.

BLUE KINGFISHER.

(PLATE 332.) *

ALCEDO AZUREA Latham, Index Ornith. Suppl., p. xxxii., 1801: "In Insula Norfolk" errore = New South Wales.

Azure Kingfisher Latham, Gen. Synops. Birds, Suppl. II., p. 372, 1801.

Alcedo azurea Latham, Index Ornith. Suppl., p. xxxii., 1801; Swainson, Zool. Illus., 1st Series, pl. 26, 1820.

Alcedo tribrachys Shaw and Nodder, Naturalists' Miscellany, Vol. XVI., pl. 681, 1805: New South Wales.

Ceyx tribrachys Cuvier, Règne Animal, Vol. I., p. 417, 1816.

Ceyx azurea Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. 2, p. 106, 1826; Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 208, 1827; Jardine and Selby, Illus. Ornith., Vol. ii., pl. 55, 1828.

Ceyx cyanea Lesson, Traité d'Ornith., p. 241, September, 1830: "Timor" errore = New South Wales.

Alcedo tridactyla Lesson, *ib.*, error pro *tribrachys*.

Alcyone australis Swainson, Classif. Birds, Vol. II., p. 336, 1837: New South Wales.

Alcyone azurea Ewing, Tasm. Journ. Sci. Arts, Vol. I., p. 56, 1842 (Tas.); Gould, Birds Austr., pt. xix. (Vol. II., pl. 25), 1845; Bonaparte, Consp. Gen. Av., Vol. I., p. 158, 1850; Cassin, Cat. Halc. Philad. Mus., p. 5, 1852; Gould, Handb. Birds Austr., Vol. I., p. 139, 1865; Sharpe, Proc. Zool. Soc. (Lond.) 1869, p. 355; *id.*, Monagr. Alced., p. 41, pl. 13, 1870; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878; North, Proc. Linn. Soc. N.S.W., Ser. II., Vol. ii., p. 1163, 1887; Ramsay, Tab. List Austr. Birds, p. 3, 1888; North, Austr. Mus. Cat., No. 12, p. 40, 1890; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 168, 1892; Ramsay, Cat. Austr. Picariæ, p. 17, 1894; Hall, Key Birds Austr., p. 56, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 547, 1901; A. G. Campbell, Emu, Vol. II., p. 16, 1902 (Vic.); H. E. Hill, *ib.*, p. 162, 1903 (Vic.); Batey, *ib.*, Vol. VII., p. 11, 1907 (Vic.); G. F. Hill, *ib.*, p. 21 (Vic.); Austin, *ib.*, Vol. VII., p. 74, 1907 (N.S.W.); Mathews, Handl. Birds Austral, p. 53, 1908; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 353, 1909; Littler, Handb. Birds Tasm., p. 80, 1910; Broadbent, Emu, Vol. X., p. 235, 1910 (N.Q.); Cheney, *ib.*, Vol. XIV., p. 207, 1915 (Vic.).

* The plate is lettered *Alcyone alisteri*.



Roland Green .del.

Witherby & Co

$\frac{7}{8}$

ALCYONE ALISTERI.
(WESTERN PURPLE KINGFISHER).



BLUE KINGFISHER.

Alcyone diemenensis * Gould, Proc. Zool. Soc. (Lond.) 1846, p. 19: Tasmania; *id.*, Introd. Birds Austr., 8vo ed., p. 31, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 141, 1865; Sharpe, Proc. Zool. Soc. (Lond.) 1869, p. 355; *id.*, Monogr. Alced., p. 47, 1870; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878; Legge, Papers Proc. Roy. Soc. Tasm., 1886, p. 238, 1887; Ramsay, Tab. List Austr. Birds, p. 3, 1888.

Alcyone pulchra Gould, Proc. Zool. Soc. (Lond.) 1846, p. 19: Port Essington, Northern Territory; *id.*, Introd. Birds Austr., 8vo ed., p. 31, 1848; Elsey, Proc. Zool. Soc. (Lond.) 1857, p. 25 (N.T.); Gould, Handb. Birds Austr., Vol. I., p. 141, 1865; Sharpe, Proc. Zool. Soc. (Lond.) 1869, p. 356; *id.*, Monogr. Alced., p. 45, pl. 14, 1870; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 583 (Q.); Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 380, 1876 (Q.); Ramsay, *ib.*, Vol. II., p. 179, 1878; Masters, *ib.*, p. 270 (N.T.); Ramsay, Tab. List Austr. Birds, p. 3, 1888; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 169, 1892; Ramsay, Cat. Austr. Picariæ, p. 20, 1894; Hall, Key Austr. Birds, p. 56, 1899; Mathews, Handl. Birds Austr., p. 53, 1908; *id.*, Emu, Vol. IX., p. 6, 1909 (N.W.A.); G. F. Hill, *ib.*, Vol. X., p. 271, 1911 (N.W.A.); Barnard, *ib.*, Vol. XI., p. 23 (N.Q.); G. F. Hill, *ib.*, Vol. XII., p. 255, 1913 (N.T.); Macgillivray, *ib.*, Vol. XIII., p. 159, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.).

Alcyone azurea var. *diemenensis* Ramsay, Cat. Austr. Picariæ, p. 19, 1894.

Alcyone azurea subsp. *pulchra* Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 549, 1901; Le Souëf, Emu, Vol. II., p. 93, 1902 (N.T.).

Alcyone azurea azurea Hartert, Nov. Zool., Vol. VI., p. 427, 1899; Rothschild and Hartert, *ib.*, Vol. VIII., p. 142, 1901; Mathews, Nov. Zool., Vol. XVIII., p. 285, 1912; *id.*, List Birds Austr., p. 145, 1913.

Alcyone azurea pulchra Hartert, Nov. Zool., Vol. VI., p. 427, 1899 (Cape York); Robinson and Laverock, Ibis, 1900, p. 639 (N.Q.); Rothschild and Hartert, Nov. Zool., Vol. VIII., p. 142, 1901; Mathews, *ib.*, Vol. XVIII., p. 285, 1912; *id.*, List Birds Austr., p. 145, 1913.

Alcyone azurea victoriæ Mathews, Nov. Zool., Vol. XVIII., p. 285, 1912: Frankston, Victoria; *id.*, List Birds Austr., p. 145, 1913.

Alcyone azurea diemenensis Mathews, Nov. Zool., Vol. XVIII., p. 285, 1912; *id.*, List Birds Austr., p. 145, 1913.

Alcyone azurea mixta Mathews, Nov. Zool., Vol. XVIII., p. 285, 1912: Cooktown, N. Queensland; *id.*, List Birds Austr., p. 145, 1913.

Alcyone azurea alisteri Mathews, Austral Avian Record, Vol. I., p. 37, 1912: Parry's Creek, North-west Australia; *id.*, List Birds Austr., p. 145, 1913.

DISTRIBUTION. New South Wales; Victoria; South Australia; Queensland; Northern Territory; North-west Australia.

Adult male. General colour above deep ultramarine blue, including the head, back, wings, tail, sides of the face and sides of the body; bastard-wing, primary-coverts, primary- and secondary-quills dark brown with cinnamon-rufous edges to the inner-webs;

* Also spelt *diemensis*.

THE BIRDS OF AUSTRALIA.

tail dark brown, the middle feathers more or less tinged with blue; lores, a spot on the sides of the neck, chin, and throat white at the base, tinged with lemon-yellow; breast, abdomen, and under tail-coverts rufous-chestnut; axillaries and under wing-coverts cinnamon-rufous; under-surface of quills brown with cinnamon-rufous inner edgings; lower aspect of tail brown. Eyes black, feet orange-red, bill black, tip horn. Total length 180 mm.; culmen 45, wing 70, tail 32, tarsus 10. Figured. Collected at Parry's Creek, North-west Australia, on the 4th of September, 1908.

Adult female. Similar to the above but with a black fore-head.

Immature. Resemble the adult.

Nest. A tunnel in a bank from six inches to two or three feet long.

Eggs. Clutch, five to six. White, roundish and glossy. 23 to 25 mm. by 19-20.

Breeding-season. October to December.

THIS is one of the birds Latham described in the Additions to the Second Supplement to the General Synopsis of Birds from "Norfolk Island." As noted hereafter, this was incorrect, as this species does not occur on Norfolk Island, and the specimen apparently came from Sydney, from which locality a bird was soon afterwards described under a new name by Shaw and Nodder. Latham's description was soon afterwards recognised, as his name was attached to Lewin's painting, whose remarks read: "It inhabits heads of rivers, visiting dead trees, from the branches of which it darts on its prey in the water beneath, and is sometimes completely immersed by the velocity of its descent." Swainson, in his first series of *Zoological Illustrations*, gave a good painting of this bird under Latham's name, and discussed the structure of the feet, but gave no notes on its habits.

Vigors and Horsfield, in their Essay on Australian Birds, where they made so many (necessary) generic innovations, transferred this species to *Ceyx*, on account of its lack of the inner fore-toe, without comment, and added: "Mr. Caley thus observes upon this bird in his manuscripts: 'I have never noticed this species leaving the salt water beyond the distance of two hundred yards, and seldom so far. It inhabits the harbour of Port Jackson, particularly the upper parts of the branches or creeks. Some birds have the breast considerably more red than others. I have met with what I considered to be the same species in a bushy creek at Western Port. I never saw it alight in trees.'"

The next note is Gould's, and I here transcribe it, as it shows his close criticism of the birds he handled from Australia, as well as his careful records of the habits and manners of the species that came under his own observation when in Australia.

Gould treated this species as being divisible into three species, writing: "With the exception of Swan River, every colony of Australia, from Port Essington on the north-west to Tasmania in the extreme south, is inhabited

BLUE KINGFISHER.

by Azure Kingfishers; but as they, although closely allied, constitute at least three species, the present page must necessarily treat exclusively of the one that inhabits New South Wales and South Australia, over the whole of which countries it is dispersed, wherever brooks, ponds and other waters occur suitable to its habits and mode of life. In size and in brilliancy of its plumage, the Azure Kingfisher is intermediate between the species inhabiting the north coast and that found in Tasmania; although generically distinct from the Kingfisher of Europe (*Alcedo ispida*) it has many characters in common with that bird. It subsists almost exclusively on small fish and aquatic insects, which it captures in the water by darting down from some bare branch overhanging the stream, and to which it generally returns to kill and devour its prey, which is swallowed entire and head foremost, after the manner of the little favourite of our own island. It is a solitary bird, a pair, or frequently only one, being found at the same spot. During the breeding-season it becomes querulous and active, and even pugnacious if any intruder of the same species should venture within the precincts of its abode. The males at this season chase each other up and down the stream with arrow-like quickness, when, the rich azure-blue of the back glittering in the sun, they appear more like meteors, as they dart by the spectator, than birds. The task of incubation commences in August and terminates in January, during which period two broods are frequently brought forth. The eggs, which are of a beautiful pearly or pinkish white, and rather round in form, are deposited at the extremity of a hole, in a perpendicular or shelving bank, bordering the stream, without any nest being made for their reception; they are from five to seven in number, three-quarters of an inch broad by seven-eighths of an inch long. The young at the first moult assume the plumage of the adult, which is never afterwards changed. The hole occupied by the bird is frequently almost filled up with the bones of small fish, which are discharged from the throat and piled up round the young in the form of a nest. Immediately on leaving their holes the young follow the parents from one part of the brook to another, and are fed by them while resting on some stone or branch near the water's edge; they soon, however, become able to obtain their own food, and may be observed at a very early age plunging into the water to a considerable depth to capture small fish and insects. The sexes are precisely similar in the colouring of their plumage, neither do they differ in size. The young are very clamorous, frequently uttering their twittering cry as their parents pass and repass the branch on which they are sitting."

Of *Alcyon diemenensis* Gould wrote: "This, the most southern member of the genus, differs from *A. azurea* both in colour and size. It is a native

THE BIRDS OF AUSTRALIA.

of Tasmania"; while of *A. pulchra* he observed, "exceeds in richness of colouring both the *A. azurea* and *A. diemenensis*. The portion of the country it inhabits is the neighbourhood of Port Essington and perhaps the north coast of Australia generally."

Mr. J. W. Mellor wrote me: "Along the River Torrens, South Australia, this beautiful little Kingfisher is occasionally seen, its bright blue back looking like some flashing gem as it darts with exceedingly rapid flight along the surface of the water and beneath some overhanging trees, where it will perch for a while, and then dart on again; it will now and again dart to the water and catch up some little fish that may be swimming beneath the surface, and then fly to an adjacent dead bough on the river's bank and eat its titbit. I observed this Kingfisher at the mouth of the Port Adelaide River, where it was amongst the Mangroves, and flying along the salt creeks, eating small seafish and the small crabs that abound in these localities. I have also seen it in Tasmania, New South Wales, Victoria and Queensland, where its habits are precisely the same as in South Australia."

Regarding the typical form, I have the following note from Mr. Thos. P. Austin, of Cobbara, New South Wales: "Until the summer of 1912 I never saw an Azure Kingfisher (*Alcyone azurea*) in this locality, but since then there has always been a few here; they remain throughout the year, and are slightly on the increase. It is an exceptional thing to see two birds together: they appear to be most unsociable little creatures: excepting when nesting they prefer to live a single, lonely life. I have never noticed them nesting here, but it is quite likely that they do so. When flying along a river or other water they always keep within about two feet of the surface, and mostly perch on the underneath twigs of an overhanging branch, where it is difficult to see them; at other times they will do just the reverse, and perch on a single dead stick, or a snag projecting from the water. From these perches they will suddenly dart down into the water and capture their prey—either a tiny fish, a water beetle, or some other kind of aquatic insect."

Captain S. A. White has written me: "I am not prepared to say if there is a good difference between the South Australian bird and the one from New South Wales, as I have not sufficient material to judge. They were once seen daily on the Torrens River turn at the Reedbeds, but of late have almost disappeared; this is due mostly, I think, to the numbers of sewer-rats. They are very swift-flying birds, and utter a shrill, piercing note when upon the wing; when settled on some root or snag in the river, they will repeatedly throw forward their heads, and withdraw it quickly, the body partly moving to the same motion as if they were swallowing.

BLUE KINGFISHER.

They are thinly scattered over the running streams in the ranges, which they prefer to stagnant water, but they are nowhere plentiful. The female is invariably the larger bird. The nest is made in the side of a bank, like that of other members of the family. Nesting-season, September and October. These birds dive like the true Kingfisher. The habits of the Tasmanian subspecies seem to be identical with those of the mainland form, which I have never met with in the interior."

Mr. Edwin Ashby's notes read: "This lovely little Kingfisher is not numerous, but still is found fairly widely throughout the Adelaide Hills (Mt. Lofty), frequenting the most retired creeks, nesting in holes in the creek banks. On the River Onkaparinga, near Kanganilla, South Australia, it can always be seen, and during the Christmas of 1908 I watched a specimen fishing close to me. It dashed into the water with a considerable splash from the overhanging bough on which it was perched."

Mr. J. P. Rogers' notes from Melville Island follow: "Cooper's Camp, October 26, 1911. The first of these birds was seen to-day. Nov. 5, 1911. Several have now been seen in the mangrove creeks, but are rare. Nov. 16, 1911. There are a few along the foreshore close to my camp now; here the sea is washing away the land and there is a convenient earthy bluff for them to breed in: there are old nesting-holes in this bluff. Jan. 13, 1912. Locality ten miles S.E. of Snake Bay. A few are seen every day in the paperbarks bordering the great swamp. Feb. 5, 1912. Cooper's Camp. These birds are still here, some seen every day."

In April, 1909, he had written from Wyndham, N.W.A.: "Are very rare in this district: usually found singly or in pairs on creeks."

From Cape York, North Queensland, Barnard wrote (*Emu*, Vol. XI., p. 23, 1913): "The Purple Kingfisher (*Alcyone pulchra*) is fairly plentiful along freshwater creeks, where I found them burrowing in the banks of the creeks. Several fresh burrows were dug out, but were only just ready for eggs. The length of the burrow is generally about 10 inches."

In Vol. XIII., p. 159, 1914, Macgillivray added: "First met with on the Gregory River, where a specimen (a male) was secured in July. Irides dark brown, bill black with cream-coloured tip, legs scarlet. Stomach contents, small fish. Other specimens were obtained on the creeks at Cape York." On 17th February, 1911, the following note was made: "Went to big swamp behind Charo mangroves, and searched through it. Flushed a Kingfisher (*A. pulchra*) from its nest in a mass of earth adhering to the roots of a fallen tea-tree near the edge of the swamp; it contained five fresh eggs. The tunnel was 6 inches long, oval in shape, $1\frac{3}{4}$ inches across by $1\frac{1}{4}$ deep; egg chamber 5 inches across by 4 in depth. After this they were found to

THE BIRDS OF AUSTRALIA.

be fairly plentiful along the freshwater creeks, and several old nesting-places were noted."

In the Additions to the Second Supplement of the *General Synopsis of Birds*, Latham described (p. 372, 1801) an "Azure Kingfisher," writing: "Inhabits Norfolk Island." The locality in this case, as in others among these Additions, was erroneous, as the bird does not occur at Norfolk Island. It is even possible that the species was described from Watling's Plate 79, which Sharpe deals with as follows (*Hist. Coll. Nat. Hist. B. M.*, Vol. II., p. 123, 1906): "No. 79. Sacred Kingfisher, variety.

Azure Kingfisher, Lath., *Gen. Syn., Suppl.*, ii., p. 372.

Alcedo azurea, Lath., *Ind. Orn., Suppl.*, p. xxxii.

Alcyone azurea, Sharpe, *Cat. B.*, xvii., p. 168.

This is a very good figure of *Alcyone azurea*, and has nothing to do with the Sacred Kingfisher, with which Latham attempts to identify it. Watling gives no note to this figure."

However, specimens were received in England about this time, because Shaw and Nodder described the same species in the *Naturalist's Miscellany* in 1805, under the name *Alcedo tribrachys*. As these authors did not know Latham's name was applicable, this suggests that Latham might have described it from a painting. Lesson proposed *Ceyx cyanea* for a specimen labelled "Timor," but this was the present species, and New South Wales is now given as the locality of Lesson's species.

When Swainson introduced the genus name *Alcyone* he provided a new specific name for Latham's species, but this was quite unnecessary.

The preceding names are all perfectly synonymous, but in the *Proc. Zool. Soc. (Lond.)*, 1846, Gould examined the birds and, using geographical boundaries, he separated as distinct species the birds inhabiting Tasmania and those from Port Essington, Northern Territory. This was strictly accurate but we do not now consider geographical races which show such slight differences as separable specifically, but regard them only as subspecies. For many years, however, Gould's separation was acknowledged, and specific distinction allowed to the three forms.

These three "species" were admitted by Sharpe in his "Monograph," but in the *Catalogue of the Birds in the British Museum* (Vol. XVII., p. 168, 1892) he only admitted one species, *Alcyone azurea*, and one subspecies, *Alcyone pulchra*. He concluded: "*A. diemenensis* cannot be separated from *A. azurea*, and the characters on which I depended in my 'Monograph' are merely those of an immature bird." Of the subspecies his definition reads: "Similar to *A. azurea*, but richer in colour, more purplish-blue above, brighter cinnamon-rufous or deep bay below, and further distinguished by the brilliant purplish-

BLUE KINGFISHER.

blue which extends from the cheeks to the sides of the breast and thence down the flanks." Sharpe's idea of a subspecies was apparently not the modern one, as under *A. pulchra* he includes Cape York birds and under the species *azurea* he also records Cape York specimens collected at the same time by the same collector.

Hartert, in the *Nov. Zool.* (Vol. VI., p. 427, 1899), catalogued birds from Cape York as *Alcyone azurea pulchra*, writing: "The collection contains a very fine series of this Kingfisher. I agree with Dr. Sharpe, who, in *Cat. B. Brit. Mus.*, v. 17, p. 169, calls it a subspecies of *A. azurea*, but the characters and the distribution of the two forms as given in the *Cat. B.* are not very clear. The deeper and brighter cinnamon or bay colour of the under-surface is not a character to distinguish this form with any certainty, for a number of those before me (either younger birds or individuals in older, more faded plumage) are paler than any *A. azurea azurea* I ever saw. The richer and more purplish-blue colour of the upper-side is generally apparent enough, but sometimes difficult to see. Another character, however, is not mentioned by Sharpe, viz. the smaller size, especially the shorter bill of *pulchra*. The bill in *A. a. azurea* is about 46-49 mm. (exposed part of culmen measured), the wing 75-79. In *A. a. pulchra* these measurements are: exposed culmen, 42-44; wing, 72-74 mm. The flanks are more suffused with lilac in *A. a. pulchra*, and the blue-purplish extends sometimes along the flanks, but not always. If *A. a. pulchra* is the northern representative of *A. azurea azurea*, then Sharpe's specimens, *x*, *y*, *z*, *a'* and *b'* in the list of specimens of *azurea*, must belong to *pulchra*, and I think they do so undoubtedly." Two years later, in the same periodical (Vol. VIII., p. 142), Rothschild and Hartert discussed Papuan Kingfishers and gave notes on the subspecies recognised. At that time these workers had a fair amount of material but from widely separated localities, no long series being secured. Consequently they were unable to determine the ranges of the subspecies with any exactitude, and therefore accepted the four forms recognised by Sharpe as four subspecies thus—

Alcyone azurea azurea (Latham). Southern Australia.

Alcyone azurea pulchra Gould. Northern Australia.

Alcyone azurea lessoni Cassin. New Guinea.

It was obvious that more than one subspecies would be recognisable in such an extent of country as New Guinea, but it was impossible with the many odd specimens to define such.

Alcyone azurea affinis Gray. Batchian, Halmahera, etc.

Almost simultaneously a collection was received by the Tring Museum from the Tenimber Group, and a form was distinguished by Rothschild in the

THE BIRDS OF AUSTRALIA.

Bull. Brit. Orn. Club, Vol. XI., p. 65, 1901, as *Alcyone azurea yamdenæ* from Yamdena Island.

In the meanwhile Robinson and Laverock, dealing with birds from North Queensland (*Ibis*, 1900, p. 639), called these *Alcyone azurea pulchra*, writing: "A small series of adult and immature birds from Mounts Sapphir and Bellenden Ker seem to belong to this subspecies, although the blue and lilac on the flanks is not so pronounced as in the birds from Port Essington. The dimensions are slightly larger than those given by Mr. Hartert for specimens from Cape York, the wing in the adult birds being 76-77 mm."

When I drew up my "Reference List" (*Nov. Zool.*, Vol. XVIII., 1912, p. 285), I determined the species as being divisible into five subspecies and arranged the species thus—

Alcyone azurea azurea (Latham). South Queensland, New South Wales.

Alcyone azurea victoriæ.

Differs from *A. a. azurea* in its more slender bill. Type Victoria.

Victoria, South Australia.

Alcyone azurea diemenensis (Gould). Tasmania.

Alcyone azurea pulchra (Gould). Northern Territory, North-west Australia.

Alcyone azurea mixta.

Differs from *A. a. azurea* in its slightly smaller size and darker coloration below, but it is not as dark below as *A. a. pulchra*, which it approaches in its upper coloration.

North Queensland.

At the time this was done I had few specimens from the Northern Territory, though good series from North-west Australia. Almost immediately after I received birds from the former locality and, as they were obviously separable from those from the latter, I named in the *Austral Avian Record*, Vol. I., p. 37, 1912—

"*Alcyone azurea alisteri*."

Differs from *A. a. pulchra* in its much longer bill and darker blue back.

Parry's Creek, North-west Australia."

When I prepared my "List," I reviewed the species, but was constrained to maintain these six subspecies, though at that time I was inclined to strict conservatism. When series are considered the differences are easily seen, so that the succeeding item needs a little consideration.

When Ogilvie-Grant discussed New Guinea birds in the *Ibis* Jubilee Supplement, No. 2, 1915, p. 204, he recorded from South-west New Guinea birds

BLUE KINGFISHER.

under the name *Alcyone azurea lessoni*, following Rothschild and Hartert, and wrote: "The type specimen of *A. lessoni* Cassin was obtained at Dorei, Geelvink Bay, and there can, I think, be no doubt that typical examples from that locality are indistinguishable from the series listed above. The relationship between this form and *A. azurea* Lath. is more difficult to define. As a rule Australian birds have the lower back, rump, and upper tail-coverts *blue*, almost a deep cobalt, while in New Guinea birds these parts are nearly or quite uniform purplish-blue, like the rest of the upper-parts. *A. pulchra* Gould is founded on *fully mature examples* of *A. azurea*, and has no geographical significance, being found equally in Southern Queensland and in South Australia, as well as in the Northern Territory. The measurements of the bill and wing vary, and do not afford distinguishing characters as has been stated [*cf.* Hartert, *N. Z.*, vi., p. 427 (1899)]. *A. pulchra* Gould is therefore a synonym of *A. azurea*, which ranges over the greater part of Australia, except the west. Mr. Mathews *cf.* *N. Z.*, xviii., p. 285 (1912) recognises no fewer than five subspecies in Australia and Tasmania, of which two are described for the first time! The only example of this Kingfisher in the British Museum, from the Aru Islands, Wallace Collection, has been referred by Sharpe to *A. lessoni*. I agree with this identification, the colour of the lower back, rump, and upper tail-coverts being purplish-blue like the rest of the upper-parts, the under-parts deep cinnamon, and the sides of the breast and flanks dark purplish-blue as in the so-named *A. pulchra*."

The superficiality of this criticism seems self-evident, but it is as well to make certainty sure. Apparently all New Guinea birds would be classed as *A. a. lessoni*, and all Australian birds as *A. a. azurea*, though Sharpe, Hartert and others had indicated their belief that there were subspecies in Australia. Ogilvie-Grant's statement that *A. pulchra* Gould was founded on fully mature examples of *A. azurea* is incorrect, as it was given to northern birds, and these notably differ from *mature* specimens from the south. Ogilvie-Grant's statement that it had no geographical significance, being found in *South Australia*, is also inaccurate, as there is no bird in the British Museum (or elsewhere) from South Australia that can be confused with typical *pulchra*, while the latter was in the British Museum collection. His further remarks regarding the variation in the bill and wing are equally futile, as series show constancy in these characters. Again, he marked with an exclamation the information that I recognised *five* subspecies in Australia and Tasmania, overlooking my more recent "List," which he had before him, where I had listed *six*.

All the New Guinea specimens were included under *A. a. lessoni*, the series from South Western New Guinea being regarded as "indistinguishable" from typical examples from Dorei, Geelvink Bay. "The only example of this

THE BIRDS OF AUSTRALIA.

Kingfisher in the British Museum from the Aru Islands, Wallace Collection, has been referred to *A. lessoni*. I agree with this identification, the colour of the lower back, rump, and upper tail-coverts being purplish-blue like the rest of the upper-parts, the under-parts deep cinnamon, and the sides of the breast and flanks dark purplish-blue as in the so-named *A. pulchra*." As a matter of fact, this bird stands quite alone in the whole series on account of its very dark under-coloration, and it is best to separate it at once as a separate race, under the name

Alcyone azurea wallaceana, subsp. nov.

Another peculiar form, unnoticed by Ogilvie-Grant, is a bird from Humboldt Bay, north coast of New Guinea. It is just as noticeable as the preceding, but in the reverse variation. It is very much brighter above, very much paler below, the throat being white and the under-coloration almost lacking the rufous tinge, being pale buffish-yellow. The under wing-coverts are pale yellowish, quite unlike the rufous of the other subspecies. I therefore distinguish this also as

Alcyone azurea distincta, subsp. nov.

Types of both the preceding in the British Museum.

Whether the series from South-west New Guinea can still be retained in typical *A. a. lessoni* I must leave until later, but it is suggested that they are easily separable.

There would then be seven subspecies extralimital to Australia—

Alcyone azurea affinis Gray. Batchean, Halmahera, etc.

Alcyone azurea lessoni Cassin. Arfak Peninsula, New Guinea.

Alcyone azurea distincta Mathews. North coast, New Guinea.

Alcyone azurea, subsp. (*lessoni* Ogilvie-Grant). South-west New Guinea.

Alcyone azurea wallaceana Mathews. Aru Islands.

Alcyone azurea yamdenæ Rothschild. Tenimber Islands.

Alcyone azurea, subsp. South-east New Guinea.

I have examined one specimen which does not agree with the preceding, and is nearest *A. a. distincta*: Ramsay called it *A. affinis*, which it is not much like.

GENUS—MICRALCYONE.

MICRALCYONE Mathews, Austral Avian Record, Vol. I.,
p. 107, 1912 Type *M. pusilla*.

SMALLEST Alcedinine birds, with long, compressed black bills, long wings, short tails and small legs, and feet with three toes only.

This genus agrees in structural features generally with the preceding, but is much smaller, and though similarly coloured above is differently coloured below.

The wing has the tip comprised of five primaries, the second, third and fourth subequal and longest, the first a little shorter, though longer than the fifth.

The type species of this genus was described as a *Ceyx*, but was transferred to *Alcyone* by Gould, and there remained until at the reference above given I separated it with the diagnosis: "Differs from *Alcyone* in its smaller size, longer slenderer bill and weaker feet, with shorter wings."

I did not mention coloration in that place, but I must admit that the difference in coloration was a stimulant, as hereafter shown. The size of the bird suggested *Ceyx*, and I found that species of *Ceyx* had also only three toes. Species similar to the present one were ranked under *Ceyx*, though the type of that genus was quite a different bird. There was only one name available in addition to *Ceyx*, viz. *Therosa*, and I therefore proposed *Micralcyone* and left the subject until I was able to thoroughly discuss it, as I here propose to do.

As far as I can determine there seems to be only one species in the genus, though a series of subspecies can be defined, as *richardsi* Tristram seems only subspecifically distinct.

There is, however, a *Ceyx gentiana* Tristram from the Solomon Islands which may prove a distinct species and referable to this group. Tristram noted its resemblance, but decided it was closer to *solitaria*, which he considered a black-billed *Ceyx*.

I have been much puzzled as to the relationship of *Micralcyone* and *Ceyx*. I had long ago concluded that there was a very close relationship between *Micralcyone* and some of the species ranged under *Ceyx*. I have now endeavoured to fix that relationship, but cannot satisfactorily determine it. I cannot see how these small Kingfishers can be classified save by colour, and there is one big item apparent, and that is the Alcedinine colour-pattern

THE BIRDS OF AUSTRALIA.

of the back ; but that is not present in true *Ceyx*. I can start, then, with a division into two groups, the true *Ceyx* and the Alcedinine *Ceyx*. The former eliminate themselves quite easily, as with the type species *tridactyla* Pallas can be associated *melanura* Kaup, *euerythra* Sharpe, *basilanica* Steere,* *samarensis* Steere, *mindanensis* Steere, *innominata* Salvadori, *dillwynni* Sharpe, with other subspecies. These reddish species might be divided into two groups, but they appear to be connected, so that we can leave them as one item. They are all characterised by their broad, short red bills, pinkish coloration above, yellow or white with a pink breast band underneath, sometimes the head barred with lilac, but generally this is obscure or missing.

The Alcedinine species of *Ceyx* are more intricate, and four groups can be easily distinguished, one with red bills, one with particolored bills, and two with black bills. The red-billed group has the head barred with blue, the Alcedine dorsal greenish-blue tract, the white throat, and the under-parts otherwise yellowish. In this group we see colour changes, though the colour pattern remains exact above and the coloration practically the same below. It is probable that two groups are again here confused, but I cannot separate them at the present time. I propose to name this group

Cyanoceyx, gen. nov.

and select *Ceyx lepida* Temminck as type. I refer to the present group *wallacei* Sharpe, *cajeli* Wallace, *goodfellowi* Ogilvie-Grant, *bournsi* Steere, *malamayi* Steere, *collectoris* Rothschild and *dispar* Rothschild and Hartert. As with the preceding, more subspecies may be determined, and some of the above may be so regarded. The variation in the coloration is very interesting; and when more specimens have been acquired a comparative study might lead to valuable results.

In colour pattern one of the black-billed groups very closely agrees, while the coloration is even similar, but the black bill is long and narrow and agrees very closely with that of *Alcyone*. For this group there is a name in existence—

Therosa,

and this has been used subgenerically by Salvadori. The species I have examined are *solitaria* Temminck and *meeki* Rothschild and Hartert.

This group and the next provide much thought for the students of colour values and variation in structure, as I will point out. The next group has the upper mandible dark, the lower light, with the upper coloration as in the preceding, but reddish underneath, with a sexual blue breast band. The bill is long and of medium width. This species has been the cause of much

* Moulton (*Journ. Straits Br. Roy. As. Soc.*, No. 67, Dec., 1914, p. 148) reports that *C. dillwynni*, *euerythra*, and *innominata* seem inseparable, judging from Bornean series.

MICRALCYONE.

discussion, first as to its location in *Ceyx* or *Alcyone*, and then as to the sexual differences in coloration. It recalls very forcibly in detail the true *Alcedo*, and may be a direct three-toed derivative of that genus. It requires, however, a new name, and I propose

Ceycalcyon, gen. nov.

and name *Ceyx cyanopectus* Lafresnaye as type. *C. steerii* Sharpe may be a subspecies.

Ceycalcyon cyanopectus and *C. c. steerii*.

The last group has a long, narrow black bill, but the coloration is quite peculiar. The head is black, with silvery-white spots at the sides, the dorsal tract shining silvery-white, the upper-surface otherwise black save a few silver spots on the wing-covert. The under coloration is just as strange, the white throat being succeeded by a blue-black under-surface. For this beautiful group I propose

Argyroceyx, gen. nov.,

the type being *Ceyx argentata* Tweeddale, while *Ceyx flumenicola* Steere seems only subspecifically distinct.

Argyroceyx argentata and *A. a. flumenicola*.

Before discussing the relationships of these groups I would note the variation in the small species with four toes which are confined to Africa, the "*Ceyx*" species being Indo-Malaysian.

The type of *Ispidina* has a broad, short red bill, the head barred with blue, the dorsal tract blue, the throat white, otherwise buff below. In general it is quite "*Ceyx*"-like, but has four toes. *Alcedo natalensis* Smith seems only subspecifically separable. *Halcyon leucogaster* Fraser was classed in *Ispidina* by Sharpe, but when Kaup (the splitter) introduced *Ispidina* he allowed that species to remain in *Alcedo*. It has a long, narrow red bill, the upper coloration as above, but is white below, with the sides of the body deep red. Here is a similar upper colour pattern above, combined with a different one below and a different bill structure, though the bill coloration is similar. To fix this I propose

Ispidella, gen. nov.

with *Halcyon leucogaster* Fraser as type.

Ispidella leucogaster.

Another unicum which must be specialised by a generic name is Linné's *Alcedo madagascariensis*, placed under *Ispidina* by Sharpe. This has the short, broad red bill of the latter genus, but is essentially distinct in that it is wholly reddish above and white below, the sides of the body red. There is no blue in the colours at all, nor is the head barred. It is obvious that we

THE BIRDS OF AUSTRALIA.

have here a different evolutionary product, though the source is at present unknown to me. For this group I propose

Ceycoides, gen. nov.,

the type and only species being *Ceycoides madagascariensis* (Linné.)

In coloration this group recalls the true *Ceyx*, but among the four-toed birds that genus is represented by *Ceycopsis*, which suggests once more convergence in colour-schemes.

There are, apparently, then, in Africa three small groups of four-toed Kingfishers of small size, which are of distinct origin when we examine them from the point of view of the colour student. There are two groups if we ignore colour and utilise "structural" details alone. Once more we find these groups at discord, as the structural features would class together the two diversely coloured groups, separating the two similarly coloured groups. When we deal with the three-toed species we find still more discord if the same plan be followed. Thus, if we utilise the broad red bill we have blue and red Kingfishers classed together, and if we use the blue dorsal coloration we get red- and black-billed forms together. But we can trace the variation in coloration in the broad red-billed group, and see it paralleled in the narrow black-billed group. Further, we can see the red coloration almost unchanged in the four-toed series, and we have the typically coloured four-toed bird among the three-toed association.

The conclusion would be that the loss of a toe could be achieved without change of coloration and that the red and blue three-toed groups had a perfectly distinct origin. Again, the immature of the red-billed species have black bills, so that the latter are nearest to the original form. Such conclusions would indicate that the development of these three-toed forms has proceeded rapidly along two divergent lines, so that we might have from an unknown ancestor the group *Ceycopsis* and then *Ceyx*.*

Along the other more prolific stream we may see many tributaries. If *Alcedo* be regarded as ancestral (a dubious expedient) we can easily see the evolution of *Ceyxalcyon*, and simultaneously the development of *Cyanoceyx* and *Therosa*. In these two groups we have colour alteration exactly paralleled in the pairs *C. lepida* and *C. cajeli* and *T. solitaria* and *T. meeki*. As noted above, the extreme colour variation in *Cyanoceyx* may be due to the confusion of diverse elements in this group. An outlying and difficult group is *Argyroceyx*, especially on account of the under-coloration.

It may be recalled that Sharpe realised the difficulties of these small

* Since the preceding was written a study of the forms grouped under "*Halcyon*" has suggested that *Halcyon coromanda*, now known as *Entomothera coromanda*, is a large relative of these small red *Ceyces*. It agrees in structural features to a great extent, while the coloration is very similar, and it differs altogether from all the other species classed in "*Halcyon*," which is otherwise polyphyletic.

MICRALCYONE.

Kingfishers and was inclined to allow coloration as a generic character, and went so far as to place *cyanipectus* in *Alcyone* and *philippensis* in *Ceyx*, while admitting these might be different sexes of the same species. He emphasised the point that the habits were the chief distinction between *Alcyone* and *Ceyx*, and in view of ignorance of these would call the red-backed birds *Ceyx*, the blue-backed ones *Alcyone*. Salvadori objected to this classification, and subsequently Sharpe relegated everything to *Ceyx* save the two Australian species. He suggested that anatomical study might give definite characters and I emphasise this view. I further conclude that more than one diverse group is expressed by "*Ceyx*," and the names I have proposed will assist in discriminating these. Thus, Miller wrote : "*Ceycopsis* is a weakly characterised genus, being perfectly intermediate between *Ispidina* and *Ceyx*, differing from the former only in the slightly shorter second toe." As I judge it, the resemblance between *Ispidina* and *Ceycopsis* is purely superficial and that the latter is closely allied to *Ceyx*, while the former has little relationship. Further, the interrelationship of the red and the blue species is problematical whether they be fisheaters or not. Judging from the bill structure, if the bill of *Alcyone* be that of a fisheater then "*Ceyx*" *solitaria* would be also a fisheater and also the "*leucogaster*" species of *Ispidina* which I have called *Ispidella*. Sharpe, in his "Monograph," gave a Map of the *Alcedinidæ*, and most of the above points are suggested in this Map in an indirect manner. If these small "*Ceyx*" were criticised as Miller has dealt with the American "*Ceryle*," I think we would find just as much diversity among the species as he did with the species of *Ceryle*, in details which I have not dealt with. I am convinced, however, that my classification would be confirmed by such an examination, as I have carefully criticised the superficial features of the species.

MICRALCYONE PUSILLA.

LITTLE KINGFISHER.

(PLATE 333.)*

CEYX PUSILLA Temminck and Laugier, Planch. Color. d'Ois., 100^e livr., Vol. V., pl. 595, 1836 : Baie de Lobo, New Guinea.

Alcyone pusilla halli Mathews, Nov. Zool., Vol. XVIII., p. 286, 1912 : Cairns, North Queensland.

Alcyone pusilla Gould, Birds Austr., pt. XI. (Vol. II., pl. 26), 1843 ; *id.*, Handb. Birds Austr., Vol. I., p. 142, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.) 1868, p. 383 (N.Q.) ; Sharp Monogr. Alced., p. 53, pl. 16, 1869 ; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 583 (N.Q.) ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 481, 1876 (N.Q.) ; Ramsay, *ib.*, Vol. II., p. 179, 1878 ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 171, 1892 ; Ramsay, Cat. Austr. Picariæ, p. 21, 1894 ; Hall, Key Birds Austr., p. 56, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 550, 1901 ; Mathews, Handl. Birds Austral, p. 54, 1908 ; Broadbent, Emu, Vol. X., p. 235, 1910 (N.Q.) ; Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.) ; Macgillivray, *ib.*, p. 126 (N.Q.) ; *id.*, *ib.*, Vol. XIII., p. 159, 1914 (N.Q.). North, Austr. Mus. Spec. Cat., No. 1, Vol. IV., p. 441, 1914.

Alcyone pusilla pusilla Mathews, Nov. Zool., Vol. XVIII., p. 286 (Jan. 31st), 1912 (Cape York, N. Queensland).

Alcyone pusilla halli Mathews, *ib.* : Cairns, North Queensland.

Alcyone ramsayi North, Ibis (Feb. 7th), 1912, p. 119 : Port Essington, Northern Territory ; H. L. White, Emu, Vol. XVI., p. 219, 1917 (N.T.).

Micralcyone pusilla pusilla Mathews, List Birds Austr., p. 146, 1913.

Micralcyone pusilla halli Mathews, *ib.*

Micralcyone pusilla ramsayi Mathews, *ib.*

DISTRIBUTION. North Queensland (as far south as the Cairns District) : Northern Territory.

Adult male. Head, entire back, and upper tail-coverts ultramarine-blue like the sides of the face, sides of breast and sides of body ; upper wing-coverts, primary- and secondary-quills dark brown, the median coverts and some of the outer-webs of the flight-quills slightly fringed with ultramarine-blue, the inner-webs of the latter have pale edgings ; tail also dark brown, the feathers more or less fringed with ultramarine-blue ; loreal spot, throat, breast, abdomen, under tail-coverts and under wing-coverts white or creamy-white, the last marked with brown on the margin of the wing ; under-surface of quills and lower aspect of tail brown. Eyes

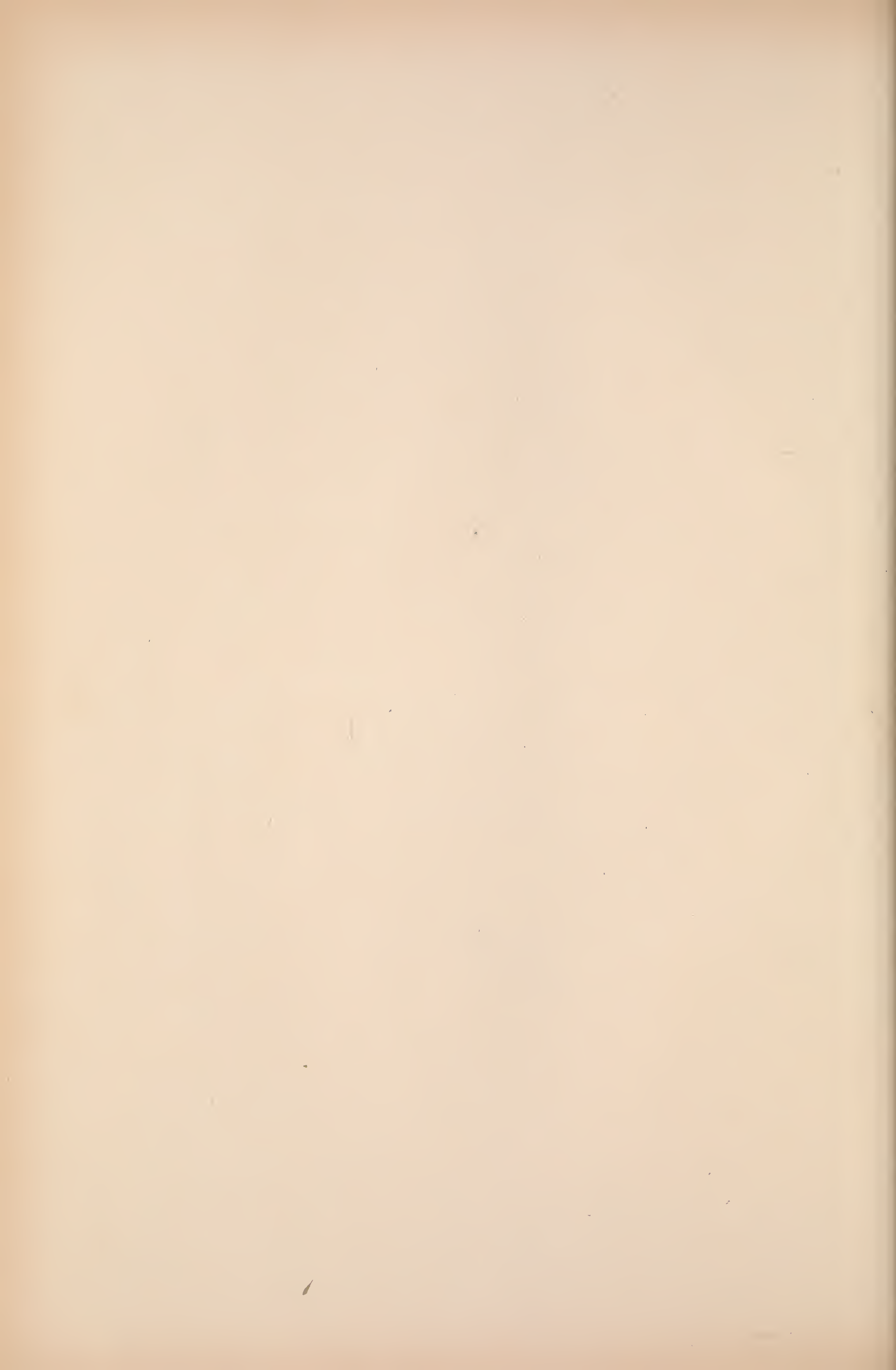
* The plate is lettered *Micralcyone halli*.



Roland Green .del.

Witherby & Co

$\frac{7}{8}$
MICRALCYONE HALLI.
(LITTLE PURPLE KINGFISHER).



LITTLE KINGFISHER.

dark brown, feet and tarsus dark grey; bill black, tip brown. Total length 112 mm.; culmen 28, wing 54, tail 23, tarsus 8. Figured. Collected at Cairns, North Queensland, in August, 1908.

Adult female. Similar to the adult male.

Immature. Has the upper-surface greenish and the patch on the side of the breast blackish-brown.

Nest. A hole in the bank of a creek.

Eggs. Clutch, five. White, nearly round in shape, texture of shell fine and glossy. 17 to 18 mm. by 14 to 15.

Breeding-season. February (Cape York).

THIS beautiful little bird was added to the Australian Avifauna through the exertions of Gilbert, whose notes were not published, but were included in the following account by Gould: "This lovely little Kingfisher is a native of the northern portions of Australia; the specimens in my collection were all procured at Port Essington, where it is a rare bird; and from it always inhabiting the densest mangroves, is not only seldom seen, but is extremely difficult to procure; in general habits and manners it very much resembles the *Alcyone azurea*, but its note is somewhat more shrill and piping, and its flight more unsteady. Specimens of this species from New Guinea, which I have had opportunities of examining in the noble collection at Leyden, present no difference whatever from those found in Australia. The food of the *Alcyone pusilla* consists of small fish, which are taken precisely after the manner of the Common Kingfisher of our own island."

The next note appears to be when Ramsay recorded it from Rockingham Bay, where he stated that it was "By no means rare, but seldom found away from the creeks in the very densest parts of the scrubs; it is always difficult to procure. Its note is a shrill, weak, piping cry, emitted chiefly while on the wing. Several specimens obtained. There is no difference in the plumage of the sexes."

Some years afterwards Masters recorded it from Cape York Peninsula.

Just recently H. L. White has published M'Lennan's notes on Northern Territory birds as follows: "Little Archer River, 6/7/15. Pairs noted along the small creeks in mangroves. King River. Occasionally noted along the river and mangrove creeks. Howard Island Channel, 31/1/16. One noted. Stomach, small fish."

When Ramsay wrote the *Catalogue of the Kingfishers in the Australian Museum*, he noted the difference in coloration between the birds from Port Essington and those from Cairns, Queensland, also noting that South-east New Guinea birds were comparable with the latter.

In the *Emu*, Vol. X., 1910, a series of notes was printed, made by Broadbent twenty years before, and of *Alcyone pusilla* he observed, p. 235:

THE BIRDS OF AUSTRALIA.

"August, Cardwell. Common in little creeks running into Gowrie Creek, in Gowrie Gorge in November. These birds appear to leave the coast for the creeks in the hills in the breeding-time, or about November. In a creek in the mountains I saw four together sitting on logs in the water, and near the beach in the summer—not one to be seen in their usual winter haunts, little mangrove creeks and swamps."

In the next volume appeared a note, p. 126: "Dr. Wm. M'Gillivray, Broken Hill, sends the following field notes received from his collector (Mr. J. M'Lennan) at Cape York: '17/2/11. Went out to big swamp behind Charo mangroves. Flushed a Little Kingfisher (*Alcyone pusilla*) from its nest in a mass of earth adhering to the roots of a fallen tea-tree in the middle of the swamp. The nest contained five eggs, slightly incubated. Tunnel six inches long and a little over an inch in diameter. Egg-chamber circular, about $4\frac{1}{2}$ inches in diameter. . . .' 30/2/11. Went down to mangroves, Mud Bay, near Somerset. Saw a couple of *Alcyone pusilla* in mangroves along the creek. Walking through the mangroves, close to the edge of the swamp, I flushed one of these birds from its nest in an old white mangrove stump; it contained five fresh eggs. Nest, a hole drilled in rotten mould; tunnel 6 inches long, $1\frac{1}{4}$ inches in diameter. Egg-chamber 5 inches across, 4 inches deep. The bird returned whilst I was taking the eggs, and sat a few feet away. The nest was 5 feet from the ground."

In Volume XIII. (p. 159) Macgillivray added: "This little bird is found in the mangrove swamps along the coast, frequenting the creeks that run through them; and as these swamps are also the haunt of the crocodile (*C. porosus*), a search for nests, often wading waist-deep in water, is no sinecure. . . The total length of the bird in the flesh is $4\frac{3}{4}$ inches; irides brown, bill black, legs blackish-brown. Stomach contents, small fish. The call is a faint whistle."

Australian birds had always been all called *Alcyone pusilla* until 1912, when North separated the Port Essington birds under the name *Alcyone ramsayi* and I described the Cairns form as differing from the Cape York one as *Alcyone pusilla halli*, writing: "Differs from *A. p. pusilla* in its much larger size and different coloration, being dark purple above, not bright blue." For this comparison Cape York specimens were regarded as typical, the type locality being Lobo, S.W. New Guinea, whence birds were not available. When such were received at the British Museum, Ogilvie-Grant did not discuss the exact relationship of the varied forms of *pusilla*, but described two new subspecies of *A. richardsi* thus: *A. r. aolæ* from Aola, Guadalcanar, Solomon Group, and *A. r. bougainvillei* from Bougainville Island, Solomon Group, while typical *A. r. richardsi* had been introduced

LITTLE KINGFISHER.

from Rendova Island, also in the Solomon Group. That is, he admitted three subspecies of *A. richardsi*, all from the Solomon Group, through allowing *A. pusilla* to range from the Moluccas over the whole of New Guinea and Northern Australia without any subspecies being discernible. I would regard, however, *A. richardsi* as displayed by Ogilvie-Grant as simply an outlying subspecific form of *A. pusilla*.

I have re-examined the Australian series, and in conjunction have criticised extra-limital birds. There are a number of ill-defined subspecies and a few well-defined forms. Geographically, we could expect Arfak Peninsula, Moluccas, South-west New Guinea, Aru Islands, and South-east New Guinea to show distinct subspecies, but no long series are available. In Australia three subspecies are certainly separable, the two furthest geographically apart being the most closely allied. I have no series from Port Essington, Northern Territory, but odd specimens from the mainland of Northern Territory cannot be separated at present from the Melville Island bird; hence, for these I use North's name subspecifically and call them

Micralcyone pusilla ramsayi (North).

The birds from Cape York are more bluish and less greenish than the preceding, and are easily separable from the next in lacking the purplish colour and being smaller in size. They are separable from the typical birds by being less purple on the upper-parts, so that they must be distinguished as

Micralcyone pusilla yorki, subsp. nov.

Type, a male collected at Cape York on the 31st January, 1912.

In the *Austral Avian Record*, Vol. II., 1915, I gave details of Diggles' papers, and (p. 149) discussed his *Alcyone assimilis* described in the *Trans. Philos. Soc. Queensl.* (Vol. II., pl. 6, 1878) as from Cape York, collected by Cockerell. I there showed that the birds so localised came from islands to the north, and concluded from the species listed that they came from the Aru Islands. I wrote: "It should be well known, but it is as well to emphasise it again, that J. T. Cockerell made a trip to Cape York, and arrived back with a large collection of birds, presumably Queensland collected, but which had been obtained on the islands to the north, apparently the Aru Islands." Since that was written I have been presented by Mr. G. S. Diggles, the son of Diggles the ornithologist, with a letterbook containing copies of letters written by Diggles on ornithological subjects, and in one appears a note advising the return of Cockerell from Cape York *and the Aru Islands*. Consequently, as I concluded, the specimens of *A. assimilis* were procured on the Aru Islands and Diggles' name is available for the Aru Island form. It would then be named

Micralcyone pusilla assimilis (Diggles).

THE BIRDS OF AUSTRALIA.

The other Australian race is well differentiated by its larger size and dark purple upper coloration, and bears the name

Micralcyone pusilla halli (Mathews). Cairns District, North Queensland.

The type locality of Temminck's species was Lobo, South-west New Guinea, and the typical subspecies must be called

Micralcyone pusilla pusilla (Temminck). South-west New Guinea.

As noted above, Ramsay indicated that South-east New Guinea specimens agreed with those from Cairns, Queensland, and were dissimilar from the Port Essington specimens. They are not exactly like Lobo birds, but it needs a series to determine these birds, the specimens in the British Museum from E. Ceram again slightly differing in shade. They seem more different from the three Solomon Island races, which have been separated. It should be observed that *A. richardsi* was separated on account of the breast band and blue under tail-coverts. Otherwise it was *M. pusilla*. Ogilvie-Grant's subspecies differ in having the breast band incomplete and the tail-coverts white, tipped with blue. A specimen in the British Museum which was relegated to *A. pusilla* agrees in these features, and came from Wood Harbour, New Ireland. All these forms are slightly larger than typical *M. pusilla*, but I think they can only be regarded as subspecies, the characters being very unstable. In which case their names would read

Micralcyone pusilla richardsi (Tristram). Rendova, Solomon Group.

Micralcyone pusilla aolæ (Ogilvie-Grant). Aola, Guadalcanar, Solomon Group.

Micralcyone pusilla bougainvillei (Ogilvie-Grant). Bougainville Island, Solomon Group.

GENUS—S Y M A .

SYMA Lesson, Bull. Sci. Nat. Ferussac, Vol. XI., p. 443,

1827 Type *S. torotoro*.

Also spelt—

Lyma Selby, Cat. Gen. Subgen., Types Aves, 1840, p. 35.

SMALL Dacelonine birds with long bills, the edges of the mandibles serrated, long wings, long graduated tails, small legs, and feet with four toes.

The bill is long, straight and pointed, of medium breadth at base, and rapidly tapering to tip; nostrils small linear slits situated at base of bill, midway between ridge and mandible edges. Culmen keeled, laterals sloping outwards, but straight; edges of upper mandibles strongly toothed, with backward sloping serrations at tip, the teeth being weaker towards middle and missing at base of bill. Edges of lower mandible simply serrated; gonys near base, ascending towards tip. Rami straight and short; inter-ramal space feathered.

The wing has the third primary longest, fourth little shorter, and second and fifth subequal, the first being shorter than the seventh.

The tail is long, more than two-thirds the length of the wing, rounded, weakly graduated, but outer tail-feathers short, not much more than two-thirds the length of the middle pair, which are scarcely longer than the succeeding three pairs.

The feet are small. The short tarsus is covered with coarse scutes in front, neither scutellation nor reticulation being observed behind; the toes are also covered with coarse transverse scutes. The inner toe is about equal in length to the hind toe and about two-thirds the length of the middle one: the outer is little shorter than the middle toe, to which it is joined for the greater part. The claws are long, that of the middle toe being much elongated.

The serrated edges of the bill are peculiar in this group, and this genus is always easily recognisable by this feature.

I think it will be as well to determine the association herewith accepted as of family value, and call it the family Dacelonidæ. Sharpe's characters for his subfamily need reconsideration, and Miller's long, detailed diagnosis

THE BIRDS OF AUSTRALIA.

is not very helpful. An item worthy of note is the distribution he gives of his three subfamilies—

“*Cerylinæ*. Both hemispheres, not in Australian or Indo-Malayan Regions.

Alcedininæ. E. Hemisphere, one slight genus, restricted to Australian Region.

Daceloninæ. E. Hemisphere, restricted to Australian Region, except two genera.”

When one of the two genera indicated in the last is known to be the “genus” *Halcyon* “of over eighty forms,” of which almost a quarter are African, the distribution looks different. This will be better discussed under the species of Australian “so-called” *Halcyon*.

It may be noted that sexual differences in “*Halcyon*” have been commonly overlooked, but in the present genus the peculiar head coloration is so remarkable that it could not be otherwise than emphasised. In this case a'so, however, I find, irrespective of the black crown patch in the female, that the latter sex is duller throughout. At present I do not know the relationship of the genus, its range indicating nothing save that it may be of Dacelonine association, but this Indo-Malayan Region has so many peculiar genera, *Lacedo*, *Melidora*, *Clytoceyx*, *Sauromarptis*, *Dacelo*, that this means little.

Since the preceding was written, a criticism of the “genus” *Halcyon* has shown the affinity of this genus, as will be explained further on.



Roland Green, del.

Witherby & Co.

$\frac{3}{4}$

SYMA FLAVIROSTRIS.
(YELLOW-BILLED KINGFISHER).

Order *ALCEDINIFORMES*.

Family *DACELONIDÆ*.

No. 386.

SYMA TOROTORO.

YELLOW-BILLED KINGFISHER.

(PLATE 334.)*

SYMA TOROTORO Lesson, Bull. Sci. Nat. Ferussac, Vol. XI., p. 443, 1827 : Dorey, New Guinea.

Halcyon (Syma ?) flavirostris Gould, in Jardine's Contr. Ornith., 1850, p. 105 : Cape York, Queensland.

Halcyon (Syma ?) flavirostris Gould, in Jardine's Contr. Ornith., 1850, p. 105 ; *id.*, Proc. Zool. Soc. (Lond.) 1850, p. 200, 1852.

Halcyon flavirostris Gould, Birds Austr. Suppl., pl. 5, 1851.

Syma flavirostris Reichenbach, Handb. Alcedinidæ, p. 44, 1851 ; Gould, Handb. Birds Austr., Vol. I., p. 135, 1865 ; Sharpe, Monogr. Alced., p. 153, pl. 56, 1869 ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 (N.Q.) ; Ramsay, *ib.*, Vol. II., p. 179, 1878 ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 197, 1892 ; Ramsay, Cat. Austr. Picariæ, p. 15, 1894 ; Hall, Key Birds Austr., p. 57, 1899 ; Hartert, Nov. Zool., Vol. VI., p. 427, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 550, 1901 ; Mathews, Handl. Birds Austral., p. 54, 1908 ; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 357, 1909 ; Barnard, Emu, Vol. XI., p. 24, 1911 ; Macgillivray, *ib.*, Vol. XIII., p. 159, 1914.

Syma torotoro flavirostris Rothschild and Hartert, Nov. Zool., Vol. VIII., p. 143, 1901 ; Mathews, *ib.*, Vol. XVIII., p. 286, 1912 ; *id.*, List Birds Austr., p. 146, 1913.

DISTRIBUTION. North Queensland (Cape York).

Adult male. Head, hind-neck, mantle, sides of face, side of neck cinnamon rufous ; breast, sides of body and under tail-coverts similar but paler ; throat and middle of abdomen white tinged with cinnamon-buff ; axillaries and under wing-coverts pale cinnamon-buff ; quills below brown with buff inner margins ; lower aspect of tail pale brown ; the space in front, above, and below the eye black ; a black line on each side of the nape ; a broader band of black on the upper back skirting the cinnamon-rufous on the mantle and extending on to the marginal lesser upper wing-coverts ; remainder of the upper wing-coverts, scapulars and outer aspect of the flight-quills oil-green, rather darker on the scapulars ; inner-webs of flight-quills dark brown with buff edgings ; lower back, rump, upper tail-coverts

* The Plate is lettered *Syma flavirostris*

THE BIRDS OF AUSTRALIA.

and tail blue, 'somewhat darker on the last. Eyes black, feet yellow, bill yellow, tip brown. Total length 180 mm.; culmen 35, wing 75·5, tail 57, tarsus 14. Figured. Collected at Cape York, North Queensland, on 8th of August, 1913.

Adult female. Head, hind-neck, mantle and sides of the face cinnamon rufous; the space in front, above, and below the eye black; a large coronal patch black, as are also the tips of the feathers on the fore-part of the head; a large ovate black spot on the sides of the nape, and a broad band across the upper back, which extends on to the marginal lesser upper wing-coverts, also black; median and greater upper wing-coverts and outer aspect of flight-quills bluish-green, becoming oil-green on the scapulars; inner-webs of flight-quills dark brown, with buff edgings; lower back, upper tail-coverts and tail blue, some of the tail-feathers margined with brown; throat white; breast, abdomen, sides of body, and under tail-coverts pale cinnamon-rufous, somewhat deeper in colour on the breast; axillaries, under wing-coverts and inner edges of quills below pale cinnamon-buff, remainder of the quills below and lower aspect of tail pale brown; eyes dark brown; feet orange-yellow; bill orange-yellow, tip blackish. Wing 78 mm. Figured. Collected at Cape York, North Queensland, on the 8th of August, 1898.

Nest. A hole in a termite's nest, placed in a tree.

Eggs. Clutch, three or four. White and roundish, 25-27 mm. by 22-23.

Breeding-season. November and December or January.

WHEN Macgillivray (the elder) collected at Cape York, in 1849, he came across this peculiar Kingfisher, and Gould contributed an account of his results, interspersed with extracts from Macgillivray's letters, to the British Association Meeting of 1850. Gould's account was printed by Jardine in his Contributions to Ornithology, and from there I extract the following. Macgillivray's letter, dated Sydney, February 29, 1850 (note the date!), included: "I have now to beg that you will examine a case of specimens sent home to Professor Forbes, in the 'St. George,' as it contains no less than eight or nine species of birds new to the Australian Fauna, all from Cape York, and the sooner the novelties are described the better. You shall have copies of my notes regarding their habits, made expressly for the supplement to your work. The new birds are: *Microglossus*, *Carpophaga*, like *C. magnifica*, *Ptilorhis magnificus*, *Aplonis metallicus*, *Hydrochelidon* (?), *Tanysiptera*, *Syma*, *Chalybæus cornutus* and *Drymodes*." Gould's comments at this place read: "Of the above, I consider the *Tanysiptera*, *Syma*, *Drymodes* and *Carpophaga* to be new to science, while the remainder have been described as pertaining to the Fauna of New Guinea, and I have accordingly characterised some of these at the meeting of the Zoological Society, held on the 23rd of July." Then was appended the descriptions of . . . *Halcyon* (*Syma*) *flavirostris*. "Smaller, but nearly allied to the *Syma torotoro* of M. Lesson. Vide Proc. of Zool. Soc., May 14th, 1850." The description appears on p. 200, which was not published until February, 1852, and thus Jardine's notes had priority of publication, and the names must be quoted from that place.

YELLOW-BILLED KINGFISHER.

Gould's full account reads: "[This species might easily be mistaken for the *Syma torotoro*; but there can be little doubt of its being distinct and new to science; its lesser size, less brilliant colouring, the yellow instead of orange hue of the bill, and the smaller size of the serrations of the mandibles, are some of the characters by which it may be distinguished from the New Guinea species. It was in that rich district the peninsula of Cape York, which appears to have a fauna peculiar to itself, that the present bird was first procured; the following notes by Mr. Macgillivray comprise all the information I have been able to obtain respecting it: "The *Poditti*, as it is called by the aborigines, appears to be a rare bird; for although it was much sought for, not more than four or five examples were obtained during our stay. Like the *Tanysiptera sylvia*, it is an inhabitant of the brushes, while the *S. torotoro* of New Guinea is a mangrove bird. I myself saw it alive only once, in a belt of tall trees, thick underwood, and clumps of the *Seaforthia* palm fringing a small stream about three miles from the sea. Attracted by the call of the bird, which was recognised by the accompanying natives as that of the much-prized *Poditti*, three or four of us remained for about ten minutes almost under the very tree in which it was perched, intently looking out for the chance of a shot, before I discovered it on a bare transverse branch, so high up as scarcely to be within range of small shot; however, it fell, but our work was only half over, as the wounded bird eluded our search for a long time; at length one of our sable allies—his eyes brightened, I dare say, by visions of a promised axe—found it lying dead in a corner, to which it had retreated. The more intelligent natives whom I questioned separately agreed in stating that its mode of nidification is similar to that of the *Tanysiptera sylvia*, and that, like that species, it lays several white eggs."

The next note I have is that written by Macgillivray (the younger), but other collectors have met with the bird at Cape York.

In the British Museum Collection are some skins recorded as from Cape York by the untruthful Cockerell, which seem to have come from that locality, and North has recorded the fact that Thorpe (Cockerell's companion) told him he collected several at Cape York. Recently Etheridge has vouched for Thorpe's veracity.

Macgillivray wrote (*Emu*, Vol. XIII., p. 159, 1914): "At Cape York Mr. M'Lennan's first note on the Yellow-billed Kingfisher was made on 2nd December, 1910: 'Noted *Syma flavirostris* for the first time; it is a beautiful bird. Saw another later in the day and heard it calling; it has a mournful call, very difficult to locate. The nest is usually in a termite's nest in a tree in scrub or in open forest, just at the edge of the scrub. They call only in the breeding-season, and the call is almost continual when there is a nest.

THE BIRDS OF AUSTRALIA.

They resent any interference with or examination of a nest, and usually abandon one that has been examined.' Another note, made on 10th January, 1912: 'Flushed a *Syma flavirostris* from its hollow in a termite's nest 25 feet from the ground at the edge of the scrub; it contained three hard-set eggs. The birds attacked me when I was taking the eggs, and struck my hand four times, once drawing blood.' Several nests were found containing young birds, but never more than three young or eggs in any nest. In the flesh the adult bird measures $7\frac{1}{2}$ inches; irides brown, bill yellow with the terminal half of the culmen brownish-black, legs yellow. Stomach usually contained small lizards and beetles."

It will be observed that little has been recorded of the life history of this Kingfisher, and as its serrated mandibles are peculiar in the Order, these would be worth while recording. The technical history of the forms is not complicated, but one or two points are worth noting. As quoted above, the Cape York bird was given specific distinction by Gould, and was so ranked in the *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 196, when only two species of the genus were recognised. The differential features were given as one species possessing a black mark along the culmen, but the possessors were reversed, the black mark being attributed to *S. torotoro*, whereas it should have been *flavirostris*, as given correctly by Gould. Further, the measurements given were unfortunately chosen, as it would appear that *flavirostris* was the bigger bird, whereas it was the smaller.

Collecting being vigorously pursued about New Guinea on account of the Tring and British Museums, specimens referable to this genus have become more common and many forms have been differentiated. Thus in 1896 Salvadori described a new species as *Syma megarhyncha*, from the Owen Stanley mountains, New Guinea, and the same year Hartert differentiated the Aru Island form as a subspecies *Syma torotoro tentelare*. In 1901 Rothschild and Hartert reviewed the species (*Nov. Zool.*, Vol. VIII., p. 143), and there accepted five subspecies of *Syma torotoro*, recognising *S. megarhyncha* as a distinct species and referring thereto as synonymous *Syma weiskei*, described by Reichenow the previous year. This latter does not concern us.

Their association of the subspecies of *S. torotoro* reads

"*Syma torotoro torotoro* Lesson.

Type locality, Dorey, Arfak Peninsula. Range, Waigou, Dorey, etc., north coast of New Guinea.

Syma torotoro tentelare Hartert.

Aru Islands.

Syma torotoro meeki Rothschild and Hartert.

Type locality, Milne Bay, S.E. New Guinea.

YELLOW-BILLED KINGFISHER.

Range from Huon Gulf on north-east coast, round East Cape to Brown River on the south coast. Nearest to next form

Syma torotoro flavirostris Gould.

Cape York, North Queensland.

Syma torotoro ochracea Rothschild and Hartert.

Type locality, Goodenough Island.

Range, Goodenough and Fergusson Islands, D'Entrecasteaux Group."

It will be noted that no subspecies was recognised from south-west New Guinea, a large extent of country. Consequently, when Van Oort received a specimen from Sabang he referred it to the Aru Island form, writing: "This specimen comes nearest to the form from the Aru Islands . . . The black patch on the head is away from the base of the bill for about 8 mm. The coloration of the upper- and under-parts is the same as in *Syma torotoro*, not paler as is the case in *Syma torotoro meeki* from south-eastern New Guinea."

When Rothschild and Hartert received from the Setakwa River three males collected by A. S. Meek they could not decide what to do, so doubtfully referred them to the south-eastern New Guinea form, *S. t. meeki*.

Ogilvie-Grant then discussed the matter in the Jubilee Supplement, No. 2, *Ibis*, 1915, in connection with a series from the Mimika River. His conclusions are peculiar, as are most of his results in that paper on this group. He wrote: "All the specimens listed are typical examples of *S. torotoro*, and agree in every way with birds from Dorei and adjacent parts of north-west New Guinea, but are, on the average, a trifle smaller, as will be seen from the measurements given below. A female specimen collected by Dr. Lorentz at Sabang, Lorentz River, has been referred by Dr. Van Oort to *S. t. tentelare* Hartert, from the Aru Islands, because the black on the crown does not reach to the base of the culmen, an interval of 8 mm. intervening. The female of the Aru bird is easily recognised by the very small black area on the middle of the crown, whereas in the present, to which Dr. Lorentz's specimen is referable, the black covers the greater part of the crown, extending over an area of about 34×20 mm. It occasionally commences at the base of the culmen or at a distance of 8-10 mm. from it, a buff-coloured space intervening. These differences are of no importance, being found in birds procured in the same locality. Messrs. Rothschild and Hartert have referred with doubt to *S. t. meeki* from south-east New Guinea, three male examples procured by A. S. Meek on the Setakwa River. With the series now available from that locality, including a number of examples of both sexes, it is clear that the specimens in Tring belong to typical *S. torotoro*. The British Museum contains three adult male examples of typical *S. t. tentelare*

THE BIRDS OF AUSTRALIA.

Hartert, from the Aru Islands, but no female; there are, however, five examples in the Tring Museum. Of *S. t. meeki* Hartert, from south-east New Guinea, the British Museum possesses typical examples of both sexes from Milne Bay, collected by A. S. Meek. These are evidently very close to the Aru race, and I doubt whether they are really separable, as the colours of both the upper- and under-parts are subject to considerable individual variation, and the supposed difference in size is of no value, as will be seen from the wing measurements given below. Sharpe, in the *Catalogue of Birds* (XVII., p. 197), distinguishes *S. torotoro* from *S. flavirostris* Gould, from Australia, by the coloration of the bill, which he incorrectly says is 'yellow with a black mark near the end of the culmen' in *S. torotoro*, while in *S. flavirostris* the bill is uniform yellow. The reverse is really the case, the Australian birds always having a black tip to the culmen. This is correctly stated and figured in the 'Monograph of the Alcedinidæ' [pp. 151-154, pls. 55 and 56 (1869)]. None of the seven specimens from New Guinea in the British Museum Collection at the time the Catalogue was written shows any trace of a black mark on the culmen, all being fully adult birds. The presence of black on the culmen in New Guinea birds denotes immaturity. I am unable to distinguish *S. t. flavirostris* except by the colour of the back, which is *brownish-olive*, usually without any trace of blue in it, while in *S. torotoro* the back is always distinctly greenish-blue. In twelve male and female examples of *S. t. flavirostris* the wing measurement varies from 74-76 mm." Of *S. torotoro* one male from Humboldt Bay gives 85 mm., one from Dorei 80 mm., three from Arfak 80-81 mm., five from Mimika River 72-79 mm., one from Setakwa River 76.5 mm. Two females from Waigiu measure in the wing 78-80 mm., one from Misol 82 mm., five from Mimika River 72-76 mm. Three males from the Setakwa River in the Tring Museum gave wing from 73-78 mm. Three males of *S. t. tentelare* all measured in the wing 76 mm., and two males and one female of *S. t. meeki* are recorded as 73-74 mm. and 75 mm. respectively."

Consideration of the same material as was studied by Ogilvie-Grant caused me to describe above his conclusions as peculiar. It is necessary to justify that statement. One item will suffice, viz. his last remark: "I am unable to distinguish *S. t. flavirostris* except by the colour of the back." The specimens show this subspecies to be distinctly smaller as to the bill, wing and tail: the bill is narrower as well as shorter, while the colour variation is great. The head and under-parts are paler, the black across the upper back is much less in extent, while the tail is pale greenish. When specimens are contrasted to the ordinary observer they appear much more different than the above remarks would indicate.

YELLOW-BILLED KINGFISHER.

Further, he determined *Syma megarhyncha* Salvadori as a distinct species, but this seems too high a value: it appears merely to be a mountain form of the species, and if this be conceded then the south-west New Guinea birds would be distinguishable from the south-east New Guinea specimens. Upon comparison I find this to be so.

I would therefore range the species in many subspecies, and as it seems a variable bird as regards geographical conditions, it is possible still more will be recognised. Above I observed that *S. megarhyncha* did not concern us, but reconsideration suggests that it is merely a mountain form of this bird, so that it must be included in a review of the species, which is represented by nine recognisable subspecies. Six of these have been already named, while the two south-western New Guinea forms are nameless. The necessity of naming the lowland race is evident, inasmuch as van Oort considered it nearest *S. t. tentelare* Hartert; Rothschild and Hartert thought it might be their *S. t. meeki*, while Ogilvie-Grant declared it to be typical *S. t. torotoro*. I propose, therefore, to name it

Syma torotoro pseustes, subsp. n.

The type is in the British Museum.

The race is smaller than the typical subspecies and differs from *S. t. meeki* in coloration, the upper surface of the tail being more bluish and the general tone of the upper surface darker.

The specimens recorded by Ogilvie-Grant as *S. megarhyncha* from the Utakwa River must also be named. The male is obviously separable by the bluish back coloration and the paler head. That this bluish colour is subspecific is seen in the female and young male also collected. The difference in coloration is as distinctive (or more so) as that accepted by Ogilvie-Grant in the case of *S. t. flavirostris* and *S. t. torotoro*. It is noteworthy that these two mountain forms should be similar so many miles apart. I propose for *Syma megarhyncha* Ogilvie-Grant (*Ibis*, Jubilee Suppl. No. 2, 1915, p. 211), not of Salvadori, the new name

Syma torotoro wellsi subsp. n.

The type is in the British Museum.

The coloration of the bill in the genus is interesting. In the immature it is wholly black, while in the typical subspecies in the adult it is wholly unicolor, yellow of some shade. In the Cape York subspecies, *S. t. flavirostris*, a black streak along the culmen is retained and this has been used as a differential feature of this race. Cockerell, however, collected some birds as at Cape York, and two of these show yellow bills, two have the black stripe. As far as can be gauged these were procured at Cape York, or else some locality other than the Aru Islands, as they do not agree with Aru Island birds but

THE BIRDS OF AUSTRALIA.

are in agreement very closely with Cape York specimens. The south-eastern New Guinea race, *S. t. meeki*, is, however, very close to the Cape York form, so that we are once more bewildered by Cockerell's wicked tricks. I am inclined to the belief that these are Australian birds, and this indicates that the black culmen streak is lost with age. The two mountain forms retain the black bill for a much longer period than the lowland races, and never attain a unicolor light-coloured bill, the greater part of the upper mandible permanently remaining black. In addition, these are larger and the bill is lengthened and thus comparatively narrower.

The specimen catalogued by Ogilvie-Grant as *S. torotoro* from Humboldt Bay, north coast of New Guinea, with a wing length of 85 mm., reaches the above in this respect, but has a decidedly short unicolor yellow bill. The back is dark *brownish-olive* without any trace of blue in it, and is certainly not distinctly greenish-blue. It is much larger than *S. t. flavirostris* and is much darker. All the birds from Humboldt Bay, when they belong to variable species, indicate subspecific differentiation, and hence it seems proper to propose

Syma torotoro connectens subsp. n.

Type in the British Museum.

It might be recorded that care must be taken in determining the back coloration, as the females and young males are more brownish than the adult males.

I have just noted that Ramsay has placed it as coming also from Port Essington, Northern Territory, in his Tabular List, but so many errors of locality occur in that List that I give no credence to this one, as I have traced no authentication of such an occurrence in any way.

GENUS—D A C E L O.

DACELO Leach, Zool. Miscell., Vol. II., p. 125, 1815 .. Type *D. gigas*.

Paralcyon Gloger, in Froriep's Notizen, Vol. XVI., 1827,
p. 278. .. Type *D. gigas*.

Agreutes Billberg, Synops. Faunæ Scand., tab. A, 1828 .. Type *D. gigas*.

Choucalcyon Lesson, Traité d'Ornith., p. 243, 1830. .. Type *D. gigas*.

Also spelt—

Chonalcyon Gray, Genera Birds, Vol. I., p. 77, 1846.

Choacalcyon, *id.*, Cat. Gen. Subgen. Birds, p. 15, 1855.

Nycticeyx Gloger, Hand. u. Hilfsb. Naturg., p. 338, 1842. .. Type *D. gigas*.

LARGEST Dacelonine birds, with long, massive bills, long wings, short tails, and small legs and feet with four toes. The bill is long, broadly triangular, tip narrowly attenuate and slightly descending, but not forming a hook, while a sinus succeeds the tip, the mandible edges thence straight and entire. The culmen is keeled, sides straight not curved. The nostrils are small slits placed at base of bill midway between culmen and mandible edges; these are more open than in the preceding family. The lower mandible is broad at base, gonys at posterior two-thirds, thence ascending; rami short, interramal space feathered.

The wing has the first primary shorter than the sixth, the intervening four subequal, the third and fourth longest. The tail is long, almost two-thirds the length of the wing: it is round, not much graduated, the outer two feathers shorter than the others, but not to a great extent. The feet are small. The very short tarsus is reticulate throughout, the reticulations very fine behind: the inner toe is longer than the tarsus, and also the hind toe, but shorter than the outer, which is subequal to the middle toe. The middle claw is very long. This is the type genus of the Dacelonidæ, and the sexes are alike, while there is an ill-defined crest present. Consequently, whether the succeeding Australian genera are truly referable to this family the present species must be. I would again quote Miller: "The natural grouping of the genera in the Daceloninæ is a matter of considerable difficulty, and no arrangement can be considered final until the internal anatomy has been examined."

These large species have been already subdivided and the name *Dacelo*

THE BIRDS OF AUSTRALIA.

restricted to the two Australian species. As *Dacelo* was formed by anagram from *Alcedo*, early ornithologists, on grounds of purism, provided substitutes, Gloger proposing *Paralcyon* in 1827, and improving (?) in 1842 by introducing *Nycticeyx*. Billberg suggested *Agreutes*. Lesson proposed *Choucalcyon* for the same group, as he had misunderstood *Dacelo* and used it for another group. This was remarked by his contemporaries and most recent writers, but Miller has recently revived *Choucalcyon* to replace *Sauromarptis* for *gaudichaudi*, citing Gray's type designation of that species in 1855. However, Lesson, in 1837, definitely stated that the type of *Choucalcyon* was *australe*, which is *Dacelo gigas*, so that *Choucalcyon* must remain a synonym of *Dacelo*. This would leave *Sauromarptis* as the name for the *gaudichaudi* group, but a complication is present in the case of *Monachalcyon*. This name was proposed for two species, *M. gaudichaudi* ex Q. and G. and *M. princeps*. At its introduction Reichenbach wrote: "Von Lesson fälschlich mit *Dacelo gigantea* zu einer Gattung vereint und beide mit einem französischen Namen—nur für französische Bücher passend—*Choucalcyon* genannt." This applies only to *gaudichaudi* and suggests this as the basis of the genus. This view was accepted by Bonaparte, who in 1854 utilised "*Choucalcyon* Bp. ex Less. (*Monachalcyon* Reich.)" for *gaudichaudi* Q. and G. alone, and classed "*monachus* Forsten (= *princeps* Forsten)" in "*Paralcyon* Bp. ex Gloger." The latter was a direct misuse of Gloger's term. Gray, in 1855, accepted Bonaparte's determination of *Monachalcyon*. Cabanis and Heine, in 1860, recognised Bonaparte's misuse of *Choucalcyon* and replaced it by *Sauromarptis* nov., stating that *Monachalcyon* had been wrongly synonymised, and that it was based on *princeps* Reichenb. = *monachus*. This view has been accepted, but it seems incorrect. I would prefer *Monachalcyon* for the *Sauromarptis* group. It may be argued that by indirect tautonymy the type would be *monachus*, but if "indirect tautonymy" were once admitted complications without end would arise, as instance *Cyanalcyon* has been typified by *pyrrhopygia*, and also used for *macleayi*, but as a synonym of the *sancta* group is *cyanea* Forster, and another name is in use for that series, and many cases could be cited. Using *Monachalcyon* for *monachus*, Miller wrote: "*Monachalcyon fulgidus* recognised by Sharpe in his Monograph as a distinct genus, *Caridonax*, I have not seen. It is apparently much like *Monachalcyon* in form, but strikingly different in coloration, and closer examination may discover characters of generic value." *Caridonax* is easily separable by colour alone, while structural differences can be easily seen. It seems to have no direct phylogenetic affinity with *Monachalcyon monachus*. While this seems to be the correct specific name, as of Bonaparte 1850, the second species admitted in the *Catalogue of the Birds in the British Museum*

DACELO.

(Vol. XVII., p. 295), under the name *Monachalcyon cyanocephalus* seems to be nameless and may be called

DANCELALCYON CONFUSUS nom. nov.

The genus name *Dacelalcyon* may replace *Monachalcyon* as used in the *Catalogue of Birds* after the elimination of *Caridonax*.

In the *Catalogue of Birds* the first reference is to *Dacelo princeps* MS. of Forsten: this does not concern systematics. Then comes *Halcyon monachus* Gray, *Genera of Birds*, Vol. I., 1846, which was simply quoted as of Temm., with no further explanation, and is purely a *nomen nudum*. In the *Cat. Fissirostral Birds B.M.*, two years later, Gray included (p. 53) *Halcyon monacha* as of Temminck, cataloguing a specimen received from the Leyden Museum. Still no description was offered, and this seems to have been first supplied by Bonaparte in 1850 (*Consp. Gen. Av.*, p. 154), who called it *Halcyon monachus*, citing *cyanocephala* and *princeps* Forsten as synonyms. In 1851 Reichenbach fully described the species under the name *Monachalcyon princeps*, again recording *cyanocephala* and also *monachus* as synonyms.

Sharpe, apparently realising Reichenbach had confused two species, selected *cyanocephalus* for the second, restricting *monachus* to the other, but this course is inadmissible and therefore a new name is necessary for the species so misnamed. Miller disagrees with Sharpe's location of the genus between *Halcyon* and *Tanysiptera*, and it is probable that the early association of the species in the neighbourhood of *Dacelo* may be nearer the truth.

Key to the Species.

♂	Tail barred	..	..	..	..	..	..	<i>D. gigas.</i>
♂	Tail uniform	..	..	..	..	..	..	<i>D. leachii.</i>
♀	Wing-coverts greenish: primaries externally greenish	..						<i>D. gigas.</i>
♀	Wing-coverts blue: primaries externally deep blue	..						<i>D. leachii.</i>

DACELO GIGAS.

BROWN KINGFISHER (LAUGHING JACKASS).

(PLATE 335.)

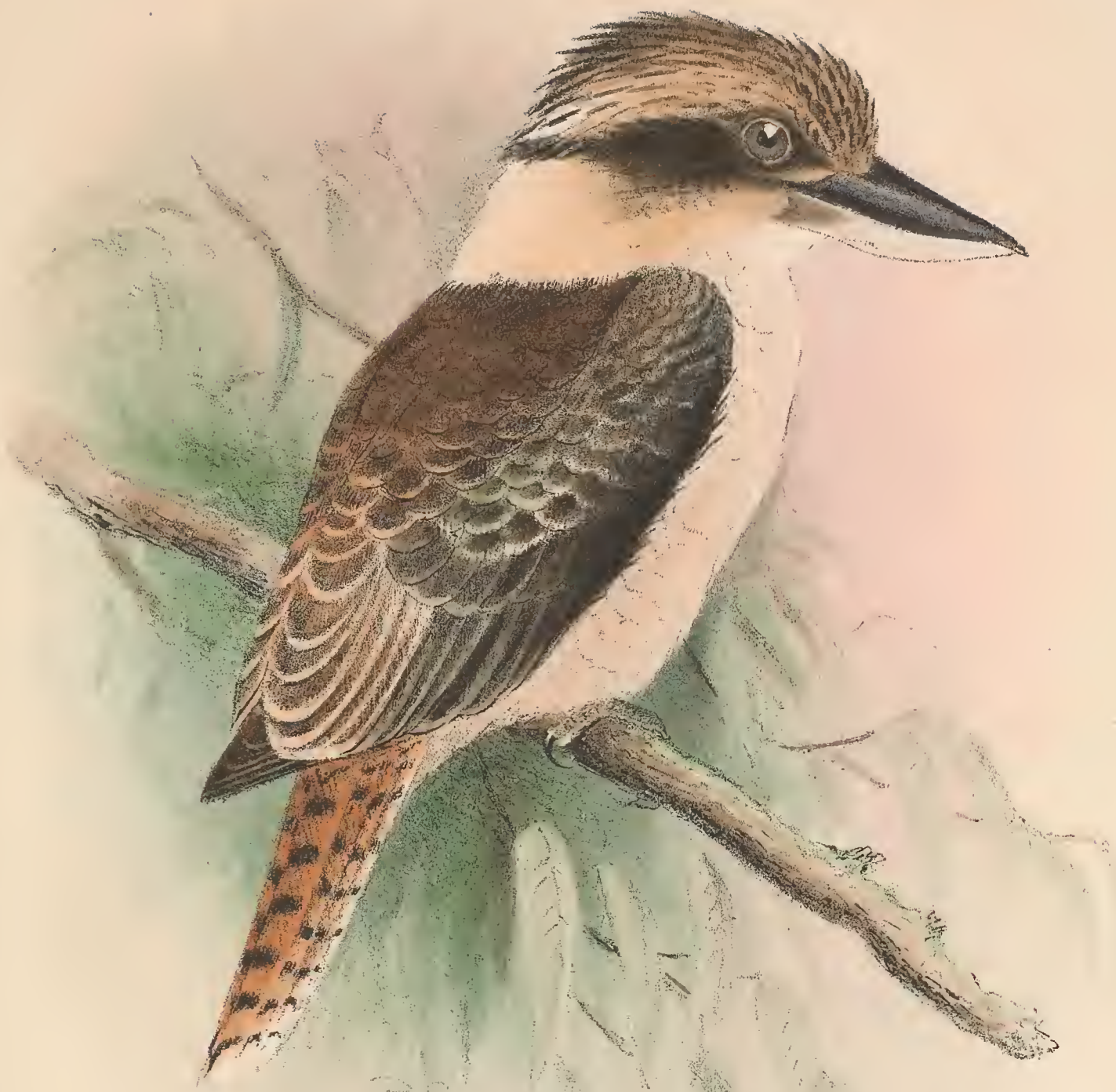
ALCEDO GIGAS Boddaert, Tabl. Planch. Enlum., p. 40, 1783: "New South Wales."

? Grand Martin-pêcheur de la Nouvelle Guinée Sonnerat, Voy. Nouv. Guin., p. 171, pl. 106, 1776.

Martin Pêcheur de la Nouvelle Guinée Daubenton, Plan. Enlum., Vol. VIII., pl. 663 (? 1778-80).

Le plus grand Martin-pêcheur Buffon, Hist. Nat. Ois., Vol. VII., p. 181, 1780.

Great Brown Kingfisher Latham, Gen. Synops. Birds, Vol. II., p. 609, 1782 (part); Phillips, Voy. Botany Bay, pl. opp. p. 287, 1789; White, Journ. Voy. N.S.W., pl. opp. p. 137, 1790; Latham, Gen. Synops. Birds, Suppl. II., p. 143, 1801; *id.*, Gen. Hist. Birds, Vol. IV., p. 9, 1822.*Alcedo gigas* Boddaert, Tabl. Plan. Enlum., p. 40, 1783.? *Alcedo undulata* Scopoli, Del Flor. et Faun. Insub., pt. II., p. 90, 1786; based on Sonnerat.*Alcedo fusca* (not of Boddaert 1783) Gmelin, Syst. Nat., p. 454, 1788 (part): based on Latham.*Alcedo gigantea* Latham, Index Ornith., Vol. I., p. 245, 1790 (part): based on Latham *ante*.*Dacelo gigantea* Leach, Zool. Miscell., Vol. II., pl. cvi., p. 125, 1815; Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 204, 1827; Gould, Birds Austr., pt. xv. (Vol. II., pl. 18), 1844; Bonaparte, Consp. Gen. Av., Vol. I., p. 153, 1850; Diggles, Ornith. Austr., pt. I., 1866.? *Dacelo fulvus* Lesson, Ann. Sci. Nat., Vol. VI., p. 244, Nov., 1825, nom. nud.*Choucalcyon australe* Lesson, Traité d'Ornith., p. 248, 1830: New South Wales.*Dacelo gigas* Gray, Gen. Birds, Vol. I., p. 78, 1846; *id.*, List Fissirostr. Birds B.M., p. 51, 1848; Reichenbach, Handb. Alced., p. 40, 1851; Gould, Handb. Birds Austr., Vol. I., p. 122, 1865; Sharpe, Monogr. Alced., p. 285, pl. 112, 1870; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 582, 1875 (Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878; Sharpe, Zool. Alert, p. 21, 1884 (N.Q.); Ramsay, Tab. List. Austr. Birds, p. 3, 1888; North, Austr. Mus. Cat., No. 12, p. 36, 1890; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 204, 1892; Ramsay, Cat. Austr. Picariæ, p. 1, 1894; Hall, Key Austr. Birds, p. 57, 1899; Robinson and Laverock, Ibis, 1900, p. 638 (Q.); Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 551, 1901; A. G. Campbell,



Roland Green, del.

Witherby & Co.

$\frac{1}{2}$
DACELO GIGAS.
(BROWN KINGFISHER).

BROWN KINGFISHER (LAUGHING JACKASS).

Emu, Vol. II., p. 16, 1902 (Vic.); H. E. Hill, *ib.*, p. 162, 1903 (Vic.); *id.*, *ib.*, Vol. III., p. 228, 1904 (W.A.); D'Ombraïn, *ib.*, Vol. IV., p. 161, 1905 (Vic.); Berney, *ib.*, Vol. VI., p. 44, 1906 (N.Q.); Batey, *ib.*, Vol. VII., p. 11, 1907 (N.S.W.); Austin, *ib.*, p. 75 (N.S.W.); Fletcher, *ib.*, p. 119 (Tas.); Mathews, Handl. Birds Austral., p. 54, 1908; North, Austr. Mus. Spec. Cat., No. 1. Vol. II., p. 358, 1909; Fletcher, Emu, Vol. VIII., p. 218, 1909 (Tas.); Hall, *ib.*, Vol. IX., p. 130, 1910 (S.A.); Broadbent, *ib.*, Vol. X., p. 234, 1910 (N.Q.); Stone, *ib.*, Vol. XII., p. 117, 1912 (Vic.); S. A. White, *ib.*, p. 127 (S.A.); Cheney, *ib.*, Vol. XIV., p. 207, 1915 (Vic.).

Paralcyon gigas Cabanis and Heine, Mus. Hein., Vol. II., p. 165, 1860.

Dacelo gigas subsp. *minor* Robinson, Bull. Liverp. Mus., Vol. II., p. 116, 1900: Cooktown, N. Queensland.

Dacelo mclennani North, Agric. Gazette, N.S.W., Vol. XXII., p. 609, 1911: Cape York, Queensland; H. L. White, Emu, Vol. XV., p. 61, 1915.

Dacelo gigas gigas Mathews, Nov. Zool., Vol. XVIII., p. 286, 1912; *id.*, List Birds Austr., p. 147, 1913.

Dacelo gigas tregellasi Mathews, Nov. Zool., Vol. XVIII., p. 287, 1912: Olinda, Victoria.

Dacelo gigas minor Mathews, *ib.*; *id.*, List Birds Austr., p. 147, 1913.

Dacelo gigas mclennani Mathews, Nov. Zool., Vol. XVIII., p. 287, 1912; *id.*, List Birds Austr., p. 147, 1913.

Dacelo minor Macgillivray, Emu, Vol. XIII., p. 160, 1914 (N.Q.); H. L. White, *ib.*, Vol. XVI., p. 162, 1917 (N.Q.).

Dacelo gigas watsoni Mathews, Austral Avian Record, Vol. III., p. 70, 1917: Watson River, North Queensland.

DISTRIBUTION. New South Wales; Queensland; Victoria; South Australia; Tasmania (Introduced); West Australia (Introduced).

Adult male. Entire head, nape, and sides of face umber-brown with paler margins to the feathers, many of the feathers on the nape white, or isabelline; cheeks and a wide collar on the hind-neck isabelline, the feathers more or less marked with brown; mantle, scapulars, and marginal upper wing-coverts earth-brown with white bases, somewhat paler on the long scapulars and innermost secondaries, both of which are margined with white at the tips, median and greater upper wing-coverts dark brown, slightly tipped on the former, and more broadly on the latter, with very pale greenish-blue; bastard-wing and primary-coverts uniform dark brown; primary- and secondary-quills white at the base, brown on the apical portion, and margined with white at the tips, more extensively on the secondaries; upper back creamy-white with dark wavy bars; lower back, rump, upper tail-coverts and basal portion of tail chestnut marked with dark brown, more boldly on the tail—the last white on the terminal portion, particularly the outer feathers; throat, breast, abdomen, under tail-coverts and sides of the body creamy-white with pale brown obsolete bars on the last; axillaries and under wing-coverts with pale brown bars, the greater series of the latter brown with white at the tips; under-surface of quills white at the base and brown on the apical portion; lower aspect of tail chestnut at the base with dark brown bars and white at the tip. Eyes light greyish-brown, feet pale brown; upper mandible black, lower dirty white, sides at the base brown. Total length 395 mm.; culmen 50, wing 190, tail 140, tarsus 25. Figured. Collected on Jardine Creek, Cape York, North Queensland, on the 25th of April, 1911.

THE BIRDS OF AUSTRALIA.

Adult female. Similar to the adult male. Cape York, 26th of April, 1911.

In the Victorian subspecies the female seems to have more rufous on the top of the head.

Immature. Resemble the adult in the general appearance.

Nest. A hole in a tree.

Eggs. Clutch, two to four, white, 39-47 mm. by 33-34.

Breeding-season. September to December or January.

WHEN Sonnerat's *Voyage to New Guinea* was published, he stated that he met with two large Kingfishers in that country, and gave figures. One of these he termed the "Grand Martin-pêcheur de la Nouvelle Guinée," and gave a plate of the bird and also a description. The plate accurately agrees, as well as ancient descriptions and figures went, with the present species save in the shape of the bill, to which no attention had been paid. The description is also quite good and both have been commonly determined as absolutely applicable to this bird. The extraordinary item is that the bird does not occur in New Guinea, yet there is no other bird at all like this one. I have long considered this matter without arriving at a reasonable solution. It has been suggested that the inhabitants of New Guinea may have had a captive bird brought back from a foray on North Australia, but that idea seems impracticable. This was put forward, but at the time Sonnerat travelled East Australia was not known to Europeans, and this species does not occur in the north, with which the Malays were in contact. At that locality a closely allied species which differs in the male having a wholly blue tail, while the female has a barred tail as in the present, is common. That species has the wing-coverts blue, while the present species has them brown, as in Sonnerat's description. As the bill is drawn so badly, it is suggested that there may be inaccuracies also in the description, and there is a possibility that the Malays might have procured the other species, while there seems no probability with regard to this one. No certainty whatever can be achieved at present, and I cite all the names in connection with Sonnerat's species with question marks to keep attention on this item. When the species was figured in the Planch. Enlum., probably from a specimen brought back by Captain Cook's party, the same erroneous locality was emphasised.

When Latham prepared his General Synopsis of Birds (Vol. II., p. 609, 1782) the Great Brown Kingfisher was included: a good description was given and the birds were said to have been in the collection of Sir Joseph Banks, "said to have come from *New Guinea*, whence Sonnerat figured the bird." Phillips, in the *Voyage to Botany Bay*, 1789, fully described the Great Brown Kingfisher on p. 287, and then gave a plate, concluding: "This species

BROWN KINGFISHER (LAUGHING JACKASS).

inhabits various places in the *South Seas*, being pretty common at *New Guinea*; but the specimen from which our figure was taken was sent from *Port Jackson* in South Wales, where, likewise, it is not unfrequently met with. We believe it has not yet been figured in any British work."

Simultaneously White, in his *Journ. Voyage New South Wales* (p. 137, 1790), also gave a plate, and, quoting, Latham's description was added: "This bird is not uncommon in many islands of the *South Seas*, being pretty frequent at *New Guinea*, from whence the specimen came from which Mr. Latham took his description; it is also an inhabitant of *New Holland*, from whence several have been sent over to *England*."

Here will be seen the continued acceptance of the New Guinea habitat, all being based on Sonnerat's work, as I cannot find any other source for the conclusions "pretty common at New Guinea." The headquarters of this bird seems to be New South Wales, and the exaggeration of the older writers is clearly seen in the phrase "not uncommon in many islands of the *South Seas*," for which I cannot see any basis at all.

It is really extraordinary that the false locality should have been so continually repeated, and I have been always on the lookout for the cause of the original error, without result, so I would be glad if my readers would note this confusion about this typical Australian bird so well-known as the Kookaburra.

This bird appears twice among the Watling paintings, and a long note is given with one of them as follows: "This bird lives on insects, worms, etc., principally, tho' sometimes seeds are found in its crop. Its by no means numerous and very solitary; still, from its note, which is that of a human loud and continued laugh, it might be considered a chearfull bird. The natives call it *Googanegang*, but with us it has the appellation of the Laughing Bird. None of them have ever been observed pairing, nor has any of their nests been found. The largest I have ever seen was the one from which this drawing was taken—from the bill end to the tip of the tail it measured $16\frac{1}{2}$ inches, and from tip to tip of the wings 18 inches. It is a bird of slow and short flight, and seems when on the wings to have some difficulty to support its forepart, which regularly from the head and bill (which is large and strong) to the tail decreases in size. The feet are of a lead colour with black claws, and small in proportion to the size of the bird. I have seen the feathers on the head form a more compleat crest than the drawing exhibits; however, in other respects it is a faithful copy. Native name Goo-ge-ne-gang, likewise this is called the Laughing Jack Ass." On the other is written, "Native name *Goo-ge-na-gan*." This latter is obviously not the work of Watling, while the former is signed "Thos. Watling, N.S. Wales."

THE BIRDS OF AUSTRALIA.

Vigors and Horsfield gave Caley's notes as follows: "The settlers call this bird the *Laughing Jackass*, and the natives, as I think, *Cuck'unda*. It is common throughout the colony, at least in all the forest-land of the interior parts. It makes a loud noise, somewhat like laughing, which may be heard at a considerable distance; from which circumstance, and its uncouth appearance, it probably received the above extraordinary appellation from the settlers on their first arrival in the country. I have also heard it called the *Hawkesbury Clock* (clocks being at the period of my residence scarce articles in the colony, there not being one, perhaps, in the whole Hawkesbury settlement), for it is among the first of the feathered tribes which announce the approach of day. When sleeping in the woods I have often found its singular noise most welcome in the morning. Its habits were very different from those of the *Three-toed Kingfisher* (*Ceyx azurea*)."

Gould's notes read: "The *Dacelo gigas* is a bird with which every resident and traveller in New South Wales is more or less familiar, for, independently of its large size, its voice is so extraordinary as to be unlike that of any other bird. In its disposition it is by no means shy, and when any new objects are presented to its notice, such as a party traversing the bush or pitching their tent in the vicinity of its retreat, it becomes very prying and inquisitive, often perching on the dead branch of some neighbouring tree, and watching with curiosity the kindling of the fire and the preparation of the meal; its presence, however, is seldom detected until it emits its extraordinary gurgling, laughing note, which generally calls forth some exclamation according with the temper of the hearer, such as 'There is our old friend the Laughing Jackass,' or an epithet of a less friendly character. . . Captain Sturt says: 'Its cry, which resembles a chorus of wild spirits, is apt to startle the traveller who may be in jeopardy, as if laughing and mocking at his misfortunes'; and Mr. Bennett, in his 'Wanderings,' says, 'Its peculiar gurgling laugh, commencing in a low, and gradually rising to a high and loud tone, is often heard in all parts of the colony, the deafening noise being poured forth while the bird remains perched upon a neighbouring tree; it rises with the dawn, when the woods re-echo with its gurgling laugh; at sunset it is again heard; and as that glorious orb sinks in the west a last "good night" is given in its peculiar tones to all within hearing.' It frequents every variety of situation . . . its food, which is of a mixed character, consists exclusively of animal substances; reptiles, insects, and crabs, however, appear to be its favourite diet; it devours lizards with avidity, and it is not an infrequent sight to see it bearing off a snake in its bill . . . it also preys on small mammalia."

Mr. Thos. P. Austin has sent me the following: "The Brown Kingfisher

BROWN KINGFISHER (LAUGHING JACKASS).

(*Dacelo gigas*) is a very common species throughout this district (Cobbora, New South Wales), but some springs they appear to be much more plentiful than others. During the big drought of 1902 they died in dozens, and for several years after they were very scarce, but during the last few years they have been much more numerous than I have ever known them to be. As the district is suffering from a very severe drought at the present time (May, 1915), and the winter is just approaching, I am afraid they will die in vast numbers during the cold weather which is in front of us. They prefer the open forest country, not being so often seen in the scrubs. Its extraordinary laughing notes are quite impossible to describe; it is mostly heard in the early morn or just after sunset, and always at its best when two or more birds are together, which is usually the case, but I have often noticed that during dry seasons they are seldom if ever heard. It has a peculiar habit of elevating its tail; this is more especially the case just after it has perched upon some dead horizontal branch of a tree. For nesting they choose a rotten part of a tree, living or dead, and taking turn about they dart at it from a neighbouring branch, and with their powerful beaks excavate a fairly large hollow; they build no nest, simply laying their eggs upon the decaying wood. The clutch is usually three, seldom four, and if not disturbed (even sometimes when they are) they will return to the same nesting hollow year after year. Like the Dollar Bird, they are wonderfully quick at hearing, they flush from their nest at the least sound of anything approaching. I have purposely tried to walk quietly up to a tree where I have known a bird to be sitting, but invariably when within about twenty yards of the tree I would see a bird's head pop out of the entrance of the hollow, then out it would fly; it may be that they have a very keen sense of smell. Some birds are very pugnacious when they have a nest. I have examined many nests containing eggs; one was in December, all the others from September 16th to the end of October."

At Cardwell, Queensland, Ramsay wrote: "Not so common as *D. leachii*: only two or three pairs noticed. Their different note at once distinguishes them even at a great distance."

Mr. J. W. Mellor's notes read: "The Laughing Jackass is widely distributed throughout the timbered and hilly parts of South Australia, the mountainous situations seeming to be preferred. In the Mount Lofty Ranges it is common, and makes its nest in the hollow of some large eucalypt, where three or four white eggs are laid, the texture of the shell being fine, therefore a glossy surface resulting. The breeding months are September to December. I have never seen it in Kangaroo Island, although splendid places are there for it to breed in. I have noted it a long way up north, also in Victoria, New South Wales, and while in the Blackall Ranges in South Queensland I saw numbers of

THE BIRDS OF AUSTRALIA.

them in the high, rough mountain country, where they were nesting in the large hollows of the forest and scrub trees. I did not see it in Tasmania, although I travelled a lot in the extreme south and also in the north. At the Reedbeds, South Australia, none of these birds were to be seen some years ago, until we introduced several pairs and put up large hollow logs for them to breed in, and by protecting them they have taken to these nesting places and brought out broods, until now there are quite a number about, and their hearty laugh is pleasing to hear in the early morning, for they are amongst the earliest risers we have, and also the laughing notes are often heard towards evening, as they select some roosting place, and wish to give vent to their entire satisfaction of the locality. Their note is almost too well known to describe : the bird starts slowly with Ooh ooh-ooh-aah-aah-aah-aah ! Ooh-ooh-ooh-aah-aah-aah !!! repeating it several times and increasing in volume, tone, and quickness each time, until one would think that the bird would fairly burst with excitement, and ends up with several ooh-ooh-ooohhs !!! that seem to come from the very bottom of its stomach, and are so drawn out and full of expression and low that one would think that it was the very last bit of breath that the bird had in its body, and was just dying with a laughing fit, but he soon recovers, and may again burst out, and have it over again, and when several of these birds are performing a trio or quartette in a tree, the concert is simply ludicrous : while giving out this outburst the bills are thrown up and kept partly open, while the tail is also cocked up until at times it almost touches the head, and the bird's throat and underpart of the body simply heave and vibrate beyond description. They are very fond of snakes, and will vigorously attack them on the ground, flying past at a great speed and digging their large, powerful and sharp bills into the reptile's skin, and then picking it up and letting it fall off and on. I have seen them attacking a monster iguana lizard as it was clambering up a tree, apparently intent on robbing a nest in the limbs above ; the old Jackasses would go some distance off, and come with great force past the offender, giving it a striking blow on the head with their bills again and again, repeating the performance in quick succession until the iguana was forced to beat a hasty retreat to save his life. They are also fond of all large grubs and insects."

Captain S. A. White sent me the following notes : " The Laughing Jackass is numerous in many parts of the Mt. Lofty Ranges. They keep to the coastal timber belts and along the Murray River, the big gum timber being their favourite habitat. The furthest north that I have met with this bird was in the Flinders Ranges in the vicinity of Port Augusta. I have never seen the bird in the dry districts of the interior. It is a very local bird, one pair breeding in the same locality for many years. They nest in September, October and November,

BROWN KINGFISHER (LAUGHING JACKASS).

selecting a hollow limb of a gum tree : two to four white and almost round eggs are laid upon the decayed wood without any effort to make a nest. Their food consists of lizards, snakes, grubs, beetles, freshwater crayfish and young birds. I have known them to exterminate the Brown Flycatcher (*Microeca*) in one locality : this may be due to man interfering with their food supply through clearing of forest land and cultivation : they will take the young birds from the nest when pressed for food. I have seen one of these birds take an hour to beat a full-grown rat to pulp before it was in a condition to swallow, and then the bird sat upon the branch with the rat's tail hanging out of its mouth waiting for the body to digest. This bird will sit motionless on a low branch of a tree watching ; all at once he will fly to the ground, give two or three pecks at the ground and shake his head after each to get rid of the earth on its bill : then sit back on its tail, pulling out a grand earthworm which it will carry to its perch, and, after pulverising, swallow. They are easily tamed and are often seen in gardens as domestic pets ; their flight is slow but slightly undulating, and even when they alight upon a limb the tail is moved up and down slowly several times. During the winter time they congregate in small parties to roost on the same bough at night, generally in some lofty old gum tree, and here just at dark and sometimes afterwards their chorus of coarse, hoarse laugh is heard, and before daylight they are the first bird to waken and give forth their morning greeting. When nesting they will become quite savage and I have had them fly at me after the manner of the Magpie."

Mr. Edwin Ashby added : "These birds are becoming very common round Adelaide wherever the timber is large. The hearty laugh of this species is often heard even in the suburbs of the City, perhaps attracted by the tame ones that are so often kept as pets by the citizens. I have met with this species in every part of Victoria I have visited where the country is timbered, and also found it common in the Blackall Range, South Queensland."

The *South Australian Ornithologist* contains one novel feature which in itself would satisfy the most exacting critic of the merit of the publication. In each number a common bird is dealt with in detail, being described and its habits and life-history given as far as possible. No authority is given to these essays, so the conclusion is that they are the joint efforts of the members of the Society. These remarks preface the fact, and in Vol. I., pt. 2, April, 1914, *Dacelo gigas* was the bird thus treated, and from the essay I select the following items as worthy of reproduction : "They live in small companies, or probably in families, separating during the day to feed, and congregating just after sunset to roost. As they meet they render their part song, which has been compared to a loud, hoarse, coarse laugh, but which to the settler

THE BIRDS OF AUSTRALIA.

is a merry good-night ; one bird beginning, followed by another, and then they all join in the chorus. This is continued till it is quite dark, or even later. The Jackass is also the first bird to awake in the morning, its merry note pealing out before one recognises that the dawn is breaking. It is usually about a quarter of an hour before the next bird awakes.

Food. Beetles, spiders, grubs, mice, lizards, small birds, especially the young taken from the nest, and the freshwater crayfish or yabbies (*Astacopsis bicarinatus*), for which it dives, catching them in water up to two feet in depth. . . It has been noted that he does not eat his food except on the ground or on a large flat, horizontal branch of a tree. . . . They swallow their pounded food whole, ejecting the indigestible portions (bones, hair, etc.) in quids. . . *Flight.* Very straight, not undulating, long, even, slow wing-movement. On alighting they throw the head back a little and elevate the tail, and usually utter a few gurgles. The tail is kept slowly moving up and down like a pump handle for a few minutes after settling. It is not jerked like that of a rail, but moves with slow, regular beats."

Mr. F. E. Howe has written me : "These Kingfishers are very common all over Victoria. What keen sight he has ! I have noticed him in the dusk of evening sitting on a fence very motionless, but suddenly he is off fully twenty yards and, pitching on the ground, picks up some unwary worm and, flying back to the fence, his tail rises spasmodically two or three times ere the worm is devoured. Whenever he perches after a flight this strange habit of raising the tail vertically gives him a most peculiar appearance. As he perches suddenly, perhaps it helps him to balance himself more readily. At Ringwood, on October 1st, 1905, in company with Messrs. Ross, Mattingley and Godfrey, a strange thing happened. One of the party had ascended a tree for the nest of *Strepera cuneicaudata* when a great noise, as if a dozen white Cockatoos were screaming in chorus, was heard. Mr. Mattingley headed a wild rush up-hill, and finding it came from the throats of two Jackasses as they lay fighting on the ground with their bills interlocked, placed a stick across their bills and secured the pair of them. So enraged were they that they were oblivious to all around, and even after capture they had to be dragged apart.

At Ferntree Gully, on Nov. 22, 1908, we found a nest containing three young in the hollow of a tall white gum about thirty feet up. Mr. Ross, using climbing-irons, scrambled up the tree. The young were not long hatched and they were blind and featherless; the bill was black, the gape was bluish-black, and the colour of the mouth was of a fleshy-pink."

Mr. E. J. Christian also wrote : "One of the most valuable birds we have, as it eats snakes, lizards, worms, insects, mice, etc. With the larger things it

BROWN KINGFISHER (LAUGHING JACKASS).

generally beats them to a pulp before eating them. I have seen it beating lizards on stumps and once saw it do the same thing to a small brown snake. Small birds such as *Acanthiza* are often killed and eaten. It often kills birds for the sake of killing, as in the summer of 1906 a Jackass killed many English Thrushes in the Botanical Gardens, Melbourne, by pouncing on them and wringing their necks, then leaving them dead. In this part we only see them in the winter, and I had written that 'the laughter is restricted to early morning and evening, never in the middle of the day unless it is raining,' but this season this is not so, as I have heard them at all times of the day. During previous years I had never heard them do this."

Mr. James Scrymgeour, of Callendon Estate, South Queensland, notes: "Early in 1909 I saw two Jackasses attack and finally kill a carpet snake, 8ft. 11in. long. The male did most of the work, and his sharp beak kept at the one spot near the neck and behind the head, eventually severing the spinal-cord, the female attracting the snake's attention."

A. G. Campbell wrote regarding North-eastern Victoria (*Emu.*, Vol. II., p. 16, 1902): "The Laughing Jackass (*Dacelo gigas*) is a useful member of the community, for, with the Magpie, it is often found about stackyards catching mice. Particularly during threshing and chaff-cutting the birds congregate, and, showing little fear of man, pounce down on the mice disturbed from cover. One Jackass met with an unfortunate reward, for it was found one day hanging from the top of a post, where its leg had been caught by loose wire, and some Magpies, following the strange but common plan in Nature, were endeavouring to end the poor bird's life."

H. E. Hill, in the same volume (p. 162), adds: "Very common, both on the plains and in the forest. We one day noticed a couple of Jackasses in a tree on the River St. George—an old bird and a young one. The old bird would give a few notes, and then the young one would try its hand, but it invariably broke down after a couple of notes. The lesson went on for a considerable time."

Campbell, in his *Nests and Eggs of Australian Birds* (p. 552, 1901), amongst others has the following items: "It has been stated that the female only voices the laughter-like notes, while the male accompanies her with the growling noise. Is it a fact? . . . I possess a pair of live Jackasses that was taken from a nest when the birds were about a month old. At the age of six weeks one endeavoured to laugh, and both could laugh loudly and lustily before they were three months old. . . Jackasses have been observed gathering mussels (*Unio*) at the edge of a creek, and whacking them against a log or limb endeavouring to open them; they will also dive for small crayfish. Mr. C. H. McLennan tells me he has observed these birds perching on a limb just over

THE BIRDS OF AUSTRALIA.

the river (Wimmera), and diving into shallow water after yabbies (small crayfish), sometimes going right under." From dates recorded he also added: "We may infer that from the time the female deposits her eggs till the young quit the nest is about six weeks."

Observations on the dates, etc., of incubation should be made.

Berney's note concerning the Richmond District, North Queensland (*Emu*, Vol. VI., p. 44, 1906) reads: "The Laughing Jackass is an uncommon bird about this part of the river; it is very seldom indeed that its jovial laugh may be heard. I have come across it, however, half a dozen times at the heads of the creeks that come down off the basalt table-land. This basalt wall, the western boundary of what is known as the basalt country, seems to bar the western extension of many coast birds; it divides the forest country from the downs. Many species that I know are common up there are practically never seen down here, although the distance from here to the piled black volcanic boulders is only forty miles. Up the Flinders, fifty miles above Richmond, where the river and the basalt meet, I used to hear old *gigas* morning and evening—not regularly, but pretty frequently."

Macgillivray (*Emu*, Vol. XIII., p. 160, 1914) recorded: "The smaller 'Laughing Jackass' was found by Mr. M'Lennan to be fairly common on the Jardine River, frequenting the tall messmate and bloodwood forest. It has much the same habits as the better-known *D. gigas*. The note is similar, but not so loud. The bird's old hollows were noted in the termites' nests in trees at a height of from ten to thirty feet from the ground. From a number of post-mortem examinations its principal food seemed to consist of beetles and grasshoppers. The iris is greyish-brown, upper mandible black, lower dirty white with sides of base brown, legs pale olive. Mr. Wheatley found this species nesting in termites' nests high up in the trees near the Batavia River; each nest contained four eggs."

Recently, the species has been acclimatised in Tasmania and West Australia, and the following notes show the results. It is necessary to have such items continually in view. Miss J. A. Fletcher, in the *Emu* (Vol. VIII., p. 218, 1909), writing from Cleveland, Tasmania: "Brown Kingfisher (*Dacelo gigas*).—*Re* this acclimatised bird, I am pleased to state they have nested in this locality for the past two seasons. The flock now numbers about nine, and their merry laughter is frequently heard during the early morning and evening."

Mr. Tom Carter has given me the following account of this bird in West Australia, which is important: "The Brown Kingfisher (*Dacelo gigas*) has been *introduced* into West Australia at various times by many people, and I understood Mr. Ernest Le Souéf, Director of the Zoological Gardens at South Perth, that he had let many free from there. Their presence is by no means

BROWN KINGFISHER (LAUGHING JACKASS).

appreciated by many of the settlers, owing to the partiality of these birds for small chickens and ducks. Thus, in 1913, a farmer in the south-west of this State, knowing my ornithological tastes, sent me a fine 'Jackass' for identification, for, as he said in his accompanying letter: 'this brute of a bird has been in the habit of coming daily to my house, and eating one or two from a fine brood of chickens, and this morning I shot it, when it had the last of them in its beak.' When visiting the Warren River, in the extreme south-west corner of West Australia, in February, 1910, I was told by Mr. W. Brockman that a pair of Jackasses had been liberated there the previous year; one of them had been shot a day or two afterwards in mistake for a 'Squeaker' (*Strepera plumbea*) by a man who was engaged in shooting Parrots and Squeakers that were eating much fruit in his orchard. The surviving bird remained in the locality for some time and then disappeared. In December, 1911, I was staying at a farm near Mount Barker (about forty miles north of Albany and *one hundred miles east* of the Warren River); there I noticed a solitary Jackass several times, and when I asked my host about it, he said that it had been there about a year. In all probability this was the bird from the Warren, as no others were known to be in that district."

Records of introduction of native birds from one State into another must be emphasised, as complications may later ensue.

H. E. Hill, in the *Emu* (Vol. III., p. 228, 1904), writing from Guildford, Western Australia, noted: "Some years ago a number of 'Laughing Jackasses' were released in various parts of the south-west. In 1902 I saw a single pair only (near the Mundaring Weir), but since then they seem to have grown rather common. There were a good many all along the Swan during the latter half of 1903, and I found a nest on the Helena River in the middle of October."

The technical history of this species contains little of interest as, though several names were early bestowed on the species, the one here used was recognised as applicable as long ago as 1846 and has since been consistently used. No subspecies were determined for many years, as, though Sharpe suggested their separation in 1870, when he wrote the *Catalogue of the Birds in the British Museum* in 1892, he concluded: "The differences between northern and southern birds suggested in my 'Monograph' do not hold good with a larger series of skins at my disposal. The brighter blue on the wing-coverts, as well as on the lower back and rump, appears to be a sign of age only, as it is more conspicuous in the older birds."

In 1900, dealing with birds received from North Queensland, Robinson named the northern subspecies on account of its smaller size and difference in coloration, but almost immediately withdrew his form, concluding in almost

THE BIRDS OF AUSTRALIA.

the same words as Sharpe had used that the differences were due to age. Eleven years later North distinguished the Cape York bird as a distinct species on account of its much smaller size. The succeeding year I added in my "Reference List" a fourth subspecies; I considered North's "species" only a subspecies, separating the Victorian bird. In my List I conservatively suppressed the last race, but I here reinstate it as it is readily recognisable when series are compared. I have also recently added

"Dacelo gigas watsoni"

Differs from *D. g. mclennani* North, in being darker above, the brown markings on the tail being conspicuous; the dark marking below the eye is narrower. Watson River, North Queensland."

Consequently we find a series from south to north almost regularly decreasing in size as they go northwards. I recognise

Dacelo gigas tregellasi (Mathews).

Victoria; South Australia.

Dacelo gigas gigas (Boddaert).

New South Wales; South Queensland.

Dacelo gigas minor (Robinson).

North Queensland (Cooktown).

Dacelo gigas watsoni (Mathews).

North Queensland (Watson River District).

Dacelo gigas mclennani (North).

North Queensland (Cape York).

Introduced and apparently now established in Tasmania and West Australia, I hope definite items of the introduction into these places will be correctly recorded and also the localities whence the birds were procured. In years to come these would be valuable were the birds to show differences. This is here commented upon, as recent records show that acclimatisation has a strong tendency to alter, subspecifically, birds recently introduced, and the West Australian introduction should show quickly such differences, while Tasmania is just as likely to indicate the rapid results of environment. I am much averse to such experiments, but am strongly of opinion that when they are initiated responsibility should also be undertaken for the correct reporting of all the circumstances surrounding such events as locality whence birds came, age, sex, number of birds, time of year, etc. Then year by year notes should be made in connection with the growth of the colony, habits, etc., as the latter commonly alter under the new environment.



Roland Green. del.

DACELO LEACHII.
(BLUE-WINGED KINGFISHER).

Witherby & Co.

Order *ALCEDINIFORMES*.

No. 388.

Family *DACELONIDÆ*.

DACELO LEACHII.

BLUE-WINGED KINGFISHER.

(PLATE 336.)

DACELO LEACHII Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 205, 1827 :
Keppel Bay, Queensland.

New Holland Kingfisher, Latham, Gen. Hist. Birds, Vol. IV., p. 11, 1822.

Dacelo leachii Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 205, 1827 :
Keppel Bay, Queensland ; Gray, Genera Birds, Vol. I., p. 78, 1846 ; Gould, Birds Austr., pt. xxxi. (Vol. II., pl. 19), 1848 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 154, 1850 ; Reichenbach, Handb. Alced., p. 41, 1851 ; Gould, Handb. Birds Austr., Vol. I., p. 124, 1865 ; Ramsay, Ibis, 1865, p. 84 (N.Q.) ; Diggles, Ornith. Austr., pt. xii., 1867 ; Sharpe, Monogr. Alced., p. 289, pl. 113, 1870 ; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 582 (Q.) ; Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 379, 1877 (Q.) ; Ramsay, *ib.*, Vol. II., p. 179, 1878 ; *id.*, Vol. VII., p. 45, 1883 ; Sharpe, Zool. Alert, p. 23, 1884 ; Ramsay, Tab. List Austr. Birds, p. 3, 1888 ; North, Austr. Mus. Cat., No. 12, p. 36, 1890 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 206, 1892 ; Ramsay, Cat. Austr. Picariæ, p. 4, 1894 ; Hall, Key Austr. Birds, p. 57, 1899 ; Hartert, Nov. Zool., Vol. VI., p. 428, 1899 (N.Q.) ; Robinson and Laverock, Ibis, 1900, p. 639 (N.Q.) ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 554, 1901 ; Webb, Emu, Vol. II., p. 29, 1902 (N.Q.) ; Le Souëf, *ib.*, 151, 1903 (N.T.) ; Berney, *ib.*, Vol. VI., p. 44, 1906 (N.Q.) ; Mathews, Handl. Birds Austral., p. 54, 1908 ; Ingram, Ibis, 1908, p. 466 (N.Q.) ; Broadbent, Emu, Vol. X., p. 234, 1910 (N.Q.) ; G. F. Hill, *ib.*, Vol. XII., p. 256, 1913 (N.T.) ; Macgillivray, *ib.*, Vol. XIII., p. 160, 1914 (N.Q.).

Dacelo cervina Gould, Birds Austr. and Adj. Islands, pt. ii., pl. 2, 1838 : Hab. ? = Port Essington, Northern Territory ; *id.*, Birds Austr., pt. xv. (Vol. II., pl. 20), 1844 ; Gray, Genera Birds, Vol. I., p. 78, 1846 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 154, 1850 ; Reichenbach, Handb. Alced., p. 40, 1851 ; Gould, Handb. Birds Austr., Vol. I., p. 125, 1865 ; Sharpe, Monogr. Alced., p. 291, pl. 114, 1870 ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 (Q.) ; *id.*, *ib.*, Vol. II., p. 270, 1878 (N.T.) ; Ramsay, *ib.*, p. 179, 1878 ; *id.*, *ib.*, Ser. ii., Vol. I., p. 1086, 1886 (N.W.A.) ; *id.*, *ib.*, Vol. II., p. 166, 1887 (N.W.A.) ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 207, 1892 ; Ramsay, Cat. Austr. Picariæ, p. 5, 1894 ; Le Souëf, Ibis, 1897, p. 392 (Q.) ; Hall, Key Birds Austr.,

THE BIRDS OF AUSTRALIA.

p. 57, 1899; *id.*, Emu, Vol. II., p. 50, 1902 (N.W.A.); Carter, *ib.*, Vol. III., p. 96, 1903 (N.W.A.); Mathews, Handl. Birds Austral., p. 54, 1908; Whitlock, Emu, Vol. VIII., p. 188, 1909 (W.A.); Mathews, *ib.*, Vol. IX., p. 6, 1909 (N.W.A.); Ogilvie-Grant, Ibis, 1910, p. 158 (W.A.); Crossmann, Emu, Vol. IX., p. 150, 1910 (N.W.A.); Mathews, *ib.*, Vol. X., p. 109, 1910 (N.W.A.); G. F. Hill, Emu, Vol. X., p. 271, 1911 (N.W.A.); Barnard (?), *ib.*, Vol. XI., p. 24, 1911 (N.Q.); G. F. Hill, *ib.*, Vol. XII., p. 256, 1913 (N.T.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.).

Dacelo cervicalis Kaup, Familie Eisvögel, p. 8, 1848: error pro *D. cervina*.

Paralcyon cervina Cabanis and Heine, Mus. Heine, Vol. II., p. 164, 1860.

Dacelo salussii Gould, Handb. Birds Austr., Vol. I., p. 125, 1865: in syn. of *D. cervina*.

Dacelo occidentalis Gould, Proc. Zool. Soc. (Lond.), 1869, p. 602: North-west Australia = Derby; Sharp, Monogr. Alced., p. 293, pl. 115, 1870; Ramsay, Proc. Linn. Soc., N.S.W., Vol. II., p. 179, 1878; Sharpe, Zool. Alert, p. 23, 1884; Ramsay, Tab. List Austr. Birds, p. 3, 1888.

Dacelo leachii subsp. *cervina* Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 555, 1901; Le Souëf, Emu, Vol. II., p. 151, 1903 (N.T.).

Dacelo leachii cervina Hartert, Nov. Zool., Vol. XII., p. 214, 1905 (N.T., N.W.A.); Mathews, *ib.*, Vol. XVIII., p. 287, 1912; *id.*, List Birds Austr., p. 147, 1913.

Dacelo leachii leachii Mathews, Nov. Zool., Vol. XVIII., p. 287, 1912; *id.*, List Birds Austr., p. 147, 1913.

Dacelo leachii occidentalis Mathews, Nov. Zool., Vol. XVIII., p. 287, 1912; *id.*, List Birds Austr., p. 148, 1913; *id.*, South Austr. Ornith., Vol. III., p. 72, 1917 (N.W.A.).

Dacelo leachii mungi Mathews, Nov. Zool., Vol. XVIII., p. 287, 1912: Mungi, North-west Australia.

Dacelo leachii nana Mathews, Austral Avian Record, Vol. I., p. 37, 1912: Melville Island, Northern Territory; *id.*, List Birds Austr., p. 147, 1913.

Dacelo leachii cliftoni Mathews, Austral Avian Record, Vol. I., p. 37, 1912: Carnarvon, West Australia; *id.*, List Birds Austr., p. 148, 1913.

Dacelo leachii kempi Mathews, Austral Avian Record, Vol. I., p. 89, 1912: Cape York, Northern Queensland; *id.*, List Birds Austr., p. 147, 1913.

DISTRIBUTION. Queensland; Northern Territory; North-west and Mid-west Australia.

Adult male. Entire head, nape, hind-neck, sides of the face, and ear-coverts brown with white margins to the feathers, which are long and lanceolate in form and impart a streaked appearance; mantle white with an isabelline tinge and minute dark tips to some of the feathers; upper back, lesser marginal upper wing-coverts, scapulars and innermost secondaries dark brown with earth-brown edgings, and white bases to the feathers, which are also fringed with white at the tips; lower back, rump, and central upper tail-coverts pale glistening blue with white bases to the feathers, the lateral coverts much darker; lesser, median, and greater upper wing-coverts pale glistening blue; the basal portion of the feathers white, and subapically dark brown; bastard-wing dull blue with dark brown inner-webs; primary-coverts and primary- and secondary-quills dark blue on the outer aspect, dark brown on

BLUE-WINGED KINGFISHER.

the apical portion of the inner-webs of the quills and white on both webs at the base; tail dark blue, dark brown on the inner-webs and broadly barred with white at the tips of the outer-feathers, but only tipped on the middle ones; cheeks isabelline with dark minute dots; chin, throat and fore-neck white; breast, sides of the body, abdomen and under tail-coverts buff, with very narrow dark edgings to the feathers; long under tail-coverts, under wing-coverts and axillaries cream-white with irregular pale brown bars on the greater series; basal portion of quills below cream-white and brown on the terminal portion; lower aspect of tail pale brown broadly barred and terminated with white on the outer feathers, the middle ones only tipped. Eyes white, tinged with brown on the outer edge; feet and tarsus very pale olive-yellow; bill black, tomium and entire lower mandible greyish-white. Total length 375 mm.: culmen 62, wing 187, tail 115, tarsus 28. Figured. Collected at Mungi, North-west Australia, on the 18th of June, 1911.

Adult female. Crown of head, nape, and sides of face dark brown with smoke-brown edges to the feathers on the fore-part of the head, and white margins to those on the nape and sides of the face, the feathers being long and narrow it imparts a streaked appearance; lores whitish with black hair-like tips to the feathers, becoming darker towards the eye and the short feathers surrounding the latter; a line of short feathers below the eye white; a wide collar round the hind neck pale buff with minute dark tips to the feathers; mantle, lesser marginal upper wing-coverts and scapulars with slightly paler margins and white bases to the feathers, some of the scapulars barred with buff; upper back white the feathers slightly tipped with pale blue—the blue increasing in extent on the rump and central upper tail-coverts where the feathers are white marked with brown, in some instances, at the base; outer lesser upper wing-coverts, median and greater series dark brown with white bases and pale blue tips; bastard-wing and primary-coverts dark blue, brown on the inner-webs; primary- and secondary-quills blue on the outer aspect, brown on the inner-webs, which are broadly edged with white, and wholly white at the base on some of the quills; lateral upper tail-coverts and tail chestnut banded with bluish-black becoming buffy-white at the tips of the outer feathers on which the dark bands are narrower; throat and fore-neck creamy-white with very narrow dark shaft lines; breast, abdomen, sides of body, vent and under tail-coverts buff with narrow dark wavy bands which become almost obsolete on the vent and under tail-coverts; axillaries and under wing-coverts creamy-white narrowly barred with pale brown; quills below creamy-white at the base and brown on the apical portion; lower aspect of tail inclining to chestnut on the middle feathers and barred with brown. Eyes white; feet and tarsi olive-brown; bill blackish-brown; lower mandible whitish. Culmen 62 mm., wing 182, tail 115, tarsus 26. Collected on Melville Island, Northern Territory, on the 15th of June, 1912.

Adult female. Differs in having the tail brown, barred with deep blue.

Immature. Resemble the adult (female) in general appearance.

Nest. A hole in a tree.

Eggs. Clutch, three to four. Like the eggs of *Dacelo gigas*, 45.5 to 46.5 mm. by 35 to 36.

Breeding-season. September to November.

WHEN Robert Brown, the famous botanist, accompanied Flinders he made a nice collection of birds, many of which were quite novel, and among them was the present species. It may be noteworthy to remark that specimens were presented to the British Museum upon his return, but no attempt was

THE BIRDS OF AUSTRALIA.

made to record or describe them, probably through Leach's ill-health. When Latham drew up his *General History of Birds* he described the specimen that had been presented to the Linnean Society under the name (Vol. IV., p. 11, 1822) "New-Holland Kingfisher. Size of the Great Brown Species. Bill the same size, colour brown, the under mandible pale; head, neck, and breast pale ash-colour streaked across with dusky lines; chin white; head furnished with a crest, consisting of elongated narrow feathers, streaked with brown; shoulders dusky black; lower part of the back and rump fine glossy verditer blue; wing-coverts mixed with the same; quills black, edged with deep blue; tail deep dirty greenish-blue, irregularly marked at the end with white; legs brown. Inhabits New Holland. In the Museum of the Linnean Society. This seems to have great affinity with the former, yet differs in many points, as may be seen, by comparing them together. We will not, however, be positive by being distinct as a species."

When Vigors and Horsfield described the birds in the Linnean Society they gave the name *Dacelo leachii* to this bird, recording that Latham had selected this designation in his Manuscript for the Second Edition of his *Index Ornithologicus*. It is noteworthy that Newton, in his *Dictionary of Birds* (Intro., p. 12), tells us "(Latham) also prepared for publication a second edition of his *Index Ornithologicus*, which was never printed, and the manuscript is now in my possession." Hence we know that this MS. is now preserved at Cambridge. Vigors and Horsfield noted: "The specimen . . . by Mr. Brown, who discovered it on the 24th October, 1802, in Keppel Bay, on the East Coast."

Of the typical *D. leachii* Gould concluded: "Its habitat may be stated to be the Cape York Peninsula and the northern part of Queensland. The habits, actions, food, and indeed the whole of the economy of the *Dacelo leachii* are so like those of the *D. gigas* that a separate description of them is unnecessary."

Of *D. cervina* he wrote: "The north-western portions of Australia constitute the true habitat of this species; it was observed in tolerable abundance by Sir George Grey during his expedition to that part of the country, and specimens of it have also formed a part of every collection of any extent made at Port Essington. In disposition it appears to be more shy and wary than the *Dacelo gigas* of New South Wales, of which it is a representative."

"Gilbert, who observed it on the Cobourg Peninsula, states that it inhabits well-wooded forests, generally in pairs, is extremely shy and very difficult to procure, and is very fond of perching on the topmost dead branch of a tree, whence it can have an uninterrupted view of everything passing around, and where it pours out its loud, discordant tones. Sometimes three or four pairs

BLUE-WINGED KINGFISHER.

may be heard at one time, when the noise is so great that no other sound can be heard. The natives assert that it breeds in the honey season, which is during the months of May, June, and July. In his *Journal of an Overland Expedition from Moreton Bay to Port Essington* Dr. Leichhardt states that 'The Laughing Jackass (*Dacelo cervina* Gould) observed near the Gulf of Carpentaria is of a different species from that of the eastern coast, is of a smaller size, and speaks a different language; but the noise is by no means so ridiculous as that of *Dacelo gigas*; he is heard before sunrise and immediately after sunset, like his representative of the eastern coast; the latter was observed as far as the Upper Lynd, where the new one made his appearance.' The food of this Kingfisher is doubtless similar to that of the *Dacelo gigas*. The stomachs of those examined by Gilbert were tolerably muscular, and contained the remains of coleopterous and other kinds of insects."

In the *Emu* (Vol. II., p. 29, 1902) E. H. Webb, writing from the Herbert River, North Queensland, recorded: "*Dacelo leachii* as a Poultry Thief.—This bird bears a rather evil reputation in this district as a chicken-stealer. That it does kill and eat chickens in considerable numbers there is no doubt, for residents here agree in considering it as bad as a hawk. It deals with chickens just as with lizards, etc., pouncing on and carrying them off to a neighbouring tree, where, after knocking their brains out against a limb, it swallows them whole. The great Kingfisher often seizes the chicks in spite of a brave resistance on the part of the mother. Only small chickens, up to about two or three weeks old, are taken. This bad habit of an otherwise harmless and useful bird will probably lead to the destruction of a large number, the *Birds Protection Act* notwithstanding."

Berney observes (*Emu* Vol. VI., p. 44, 1906): "*Dacelo leachii* is generally to be found in the river gums, where it betrays its presence by its poor attempt to laugh."

Macgillivray recorded (*Emu*, Vol. XIII., p. 160, 1914): "Fairly common on the Cloncurry, and numerous on the Leichhardt. At Cape York they were also common, frequenting and nesting in the trees in open forest. For nesting purposes they usually choose a hollow spout, whereas *D. minor* usually burrows into a termite's nest in a tree; on one occasion, however, Mr. M'Lennan found a nesting-hole of *D. leachii* in a termite's nest. At Cape York most of the nests found contained only two eggs or one young bird. No doubt the extreme and unusual dryness of the season accounted for the small clutches, as I have noted the same to occur in Victoria in respect to *D. gigas*."

Ramsay, writing about the birds of Rockingham Bay, North Queensland, stated: "Plentiful and easily procured when *not* wanted! The furthest south I have noticed this species was about the Mary and Burnet rivers; but I have

THE BIRDS OF AUSTRALIA.

received specimens said to have been shot at Toowoomba, some distance inland from Brisbane."

These latter would be the typical bird which was procured at Keppel Bay.

Mr. J. P. Rogers' observations on the Fitzroy River, North-west Australian (*Emu*, Vol. II., p. 50, 1902), are: "*Dacelo cervina*. During the heat of the day (7/4/00) this bird usually sits on a well-shaded branch, and sits so close that unless approached almost to the branch it will not move. It generally perches well hidden in leafy boughs."

Whitlock, reviewing the birds on the Pilbarra Goldfield (*Emu*, Vol. VIII., p. 188, 1909), reported: "In scattered pairs along both the Coongan and de Grey. The extraordinary guttural notes heard both at early dawn and after sunset. I was only able to locate one nest, and, as I was leaving the upper Coongan, I chopped a hole into the limb, but, to my regret, was too early for eggs. I am inclined to think the female is a close sitter and refuses to be scared from her eggs by knocking with a tomahawk on the butt of the tree. The only way to find the nest is to watch a pair, and this entails much patience, as they are apt to sit for a long time quite motionless on some dead limb."

Mr. J. P. Rogers forwarded me some notes on nestlings as follows: "Oct. 15, 1908.—Found nest with three young which were blind and naked; skin was a healthy flesh colour. Oct. 20.—Young had primaries and secondaries just starting to grow. Feather tracts show leaden-blue colour under the skin. Still perfectly blind. Oct. 24.—Primaries and secondaries well out: feather tracts still under skin: eyes of two half open, third still totally blind. Oct. 27.—All the feathers showing: primaries and secondaries three quarters of an inch long: other feathers through the skin: no down yet. Eyes partly open and looked very bleary. Oct. 31.—Nest-hollow beginning to smell very badly. Young had the feathers one inch long, but they were still in their sheaths. The birds look rather ridiculous when handled, as they stand their quills out like a porcupine. Feathers of the flank showed buff through their sheaths. Eyes are now open. Nov. 2.—One secondary on each side has burst its sheath at the point. Nov. 10.—Two of the young had their feathers half out of their sheaths; No. 3 was further advanced."

Mr. Tom Carter's notes read: "The Fawn-breasted Kingfisher is common on the Gascoyne River down to the coast, and far inland up its main tributary, the Lyons River. For many years they were never observed by me on the Minilya River (about eighty miles north of the Gascoyne), but were heard and seen there on October 4, 1902, and during my visits to that river in 1911 and 1913 they seemed fairly common. Their previous absence from that locality was probably due to the fact that from the early settlement on that

BLUE-WINGED KINGFISHER.

river (about 1882) no fish lived in it until 1899, when a small species was inadvertently brought across to the upper part of it at Williambury Station, in water tanks which had been filled on the Lyons River, where fish are plentiful. Mr. Bunbury (owner of Williambury) noted the presence of the fish in the tanks, and told the teamster to empty the remaining water into the large pool close to his house, and in the following year, 1900, there was a great flood which brought numbers of the fish right down the Minilya River, and also enabled them to swim up all its tributary creeks.

“These fine Kingfishers rest quietly in the foliage of trees during the heat of the day, but in the early morning, and again in the evening, they are very vociferous. One bird seems to start the chorus by a loud ‘Klock, klock,’ and other birds keep joining in the noise, until there is a strange medley of ‘klocks’ and laugh-like chuckles and chatterings. The owners of the many gardens and orchards on the banks of the Gascoyne River near Carnarvon look upon these birds as good friends because they destroy so many snakes, mice and silver-eyes (*Zosterops*), the latter small bird being generally regarded as a serious pest in W. Australia owing to its habit of piercing quantities of fruit with its very sharp-pointed beak, but the Kingfishers snap and eat at a gulp any small bird that they can get hold of. That the small birds look upon them as enemies is proved by the chorus of scoldings that follows their flight above the river beds. The breeding-season seems to be mostly in August, the young birds fledging in September. On August 1, 1911, I examined a nest containing four eggs in a cavity of a white gum about twenty feet from the ground, on the edge of the Gascoyne. Passing the place three days afterwards, I noticed the claw marks and scratchings made by the ascent of a large Monitor up the trunk. Climbing up to the nest, I found that the eggs had been taken by it. Sept. 9, 1911.—Recently fledged young were noted on the Minilya River. Before the young birds leave the nest, it and the immediate surroundings become very dirty and evil-smelling from excrement and fish remains, hence the aboriginal name of POOKAR for the bird, which means stinking.”

Before dealing with the subspecies, a few general notes on the sexual differences which do not appear to have been generally noted. Thus, in the *Catalogue of the Birds in the British Museum* the adult female is thus described: “Similar to the male in colour, excepting as regards the tail, which is cinnamon rufous, barred with dark blue, and white at the ends.”

This was written after years of study by Dr. Sharpe, but I note that the female has the lower back, rump, and upper tail-coverts of a different shade of blue to the male, as also the wing-coverts; the head is differently striped, the brown being less in extent; the female is also larger, with the bill longer

THE BIRDS OF AUSTRALIA.

and broader. Individually these items differ, but they are quickly recognisable when sexed series are laid out for comparison. In the *Austr. Mus. Spec. Cat.*, No. 1, Vol. II., I observe that North has noted these differences: my own results were achieved before consulting North's work. I have recorded, as many others have done, the very uneven quality of North's book, as may be seen in this item rather well. Thus, under *D. leachii* he gives the above novel observation and fairly discusses the relationships of the forms *D. cervina*, *D. occidentalis*, etc., dealing rather fully with them and accurately.

Yet under the closely allied species *D. gigas* he makes little of the differences recorded, and altogether ignores the existence of a form he himself had previously named, nor does he apologise in any way either for its omission or for his (incorrect) earlier differentiation.

It is remarkable, and I do not believe that much emphasis has been laid upon the facts, that this species differs sexually while *D. gigas* does not, and that much more variation exists in this: that its range is northern and extra-Australian, while *D. gigas* is southern and does not occur outside, though living at the extreme northern point, and not being represented in Tasmania. The genus is practically thus confined to Australia, while being absent in the extreme south-west and Tasmania.

When Gould began his *Folio Birds of Australia* he proposed as a new species *Dacelo cervina*. No locality was given, and he then went to Australia. When he came back he utilised his name for the north-western form of *leachii*, which seems to be the correct position. He still maintained it as specifically distinct, but it was soon regarded as only a subspecies. Meanwhile, however, Gould added another species, *D. occidentalis*, from the north-west of Australia, *cervina* being regarded as the Port Essington form.

When Sharpe dealt with the birds collected by the naturalists of H.M.S. "Alert," he went into much detail with regard to the relationship of the forms and, discussing *cervina* and *occidentalis*, determined the former as a subspecies only, synonymising the latter. In the *Catalogue of the Birds in the British Museum* (Vol. XVII., pp. 206, 207) this usage was continued, but the present-day strict geographical subspecies was not recognised. Thus birds from Cape York were catalogued as *Dacelo cervina*, while a specimen from Possession Island, Endeavour Strait, was ranked under *D. leachii*. The south-eastern New Guinea form was also regarded as a subspecies only.

In 1899 Hartert reported *D. leachii* from Cape York, concluding it was typical at that locality and not *cervina*. Later he recorded *D. l. cervina* from North-west Australia and Northern Territory, writing that all the birds were typical "*cervina*."

Ramsay, as long ago as 1888, had concluded: "*Dacelo cervina*,

BLUE-WINGED KINGFISHER.

D. occidentalis, *D. leachii* and Salvadori's *D. intermedia* from New Guinea should be considered merely local varieties of one and the same species: the colour, and the form of the bill, will be found to be of very little importance when a large series of these birds are carefully examined."

In my "Reference List," published in the *Nov. Zool.* (Vol. XVIII., 1912), I recognised four subspecies, thus—

"*Dacelo leachii leachii* Vigors and Horsfield. Queensland.

Dacelo leachii cervina Gould. Northern Territory.

Dacelo leachii occidentalis Gould. North-west Australia.

Dacelo leachii mungi.

Differs from *D. l. cervina* in its much smaller size; wing 185 mm.

Interior of North-west Australia.

Immediately afterwards I received a collection of birds from Melville Island and, reviewing the species, I added—

"*Dacelo leachii nana*.

Differs from *D. l. cervina* in its very much darker under-surface, head and back, also in its smaller size; wing 172 mm., bill (from nostril) 50.

Melville Island.

Dacelo leachii cliftoni.

Differs from *D. l. occidentalis* (type from Derby) in its paler under-surface, head and back.

Type from Carnarvon, Mid-west Australia."

Later, the birds from Cape York came to hand, and they were at once differentiated as—

"*Dacelo leachii kempfi*.

Differs from *D. l. leachii* in being smaller in size and darker in colour."

This was inevitable, as Sharpe had considered them *cervina* and Hartert *leachii*.

Conservatively I suppressed *D. l. mungi*, recognising only six subspecies in my List in 1913. When Ogilvie-Grant dealt with the collections of New Guinea birds made in south-west New Guinea he recorded them as *Dacelo leachii intermedia*, noting that they were very dark specimens.

I have again re-examined my augmented series in connection with other material, and now admit many subspecies.

Dacelo leachii leachii Vigors and Horsfield.

Mid-Queensland.

The underparts are white, thickly freckled with wavy crosslines of brown.

Dacelo leachii kempfi Mathews.

North Queensland.

Smaller than preceding, and less freckling above, while darker above, leading to *D. l. intermedius*.

THE BIRDS OF AUSTRALIA.

Dacelo leachii macarthuri subsp. nov.

Macarthur River, Northern Territory.

These birds are paler on the back than the typical *cervina*, and also paler below, but differ from typical *leachii* in the pale fulvescent under-surface and smaller size. Type from Borroloola, Macarthur River, Northern Territory, a male collector on the 20th May, 1913.

Dacelo leachii cervina Gould.

Port Essington, Northern Territory.

These are buff below, but rarely as deeply coloured as the type specimen, but still a well-marked subspecies.

Dacelo leachii nana Mathews.

Melville Island, Northern Territory.

This is a very well-marked insular form, its small size and deeply coloured under-surface, notably crossbarred, being peculiar.

Dacelo leachii occidentalis Gould.

North-west Australia.

This subspecies can easily be recognised when series are examined, being almost as dark as the preceding below but paler above.

Dacelo leachii mungi Mathews.

Interior North-west Australia.

No further specimens are to hand, but the variation recognised suggests the retention of this subspecies.

Dacelo leachii cliftoni Mathews.

Mid-west Australia.

This subspecies seems valid, as the head and back are paler, while the under-surface is darker and almost uniform, very little barring being present.

This species has representatives in New Guinea as follows:—

Dacelo leachii intermedius Salvadori.

South-east New Guinea.

This form is very dark above, while pale, almost white, below; the bill is longer and the head darker.

Dacelo leachii superfluus subsp. nov.

South-west New Guinea.

The specimens in the British Museum from the Mimika River, south-west New Guinea, are still darker and deeper in coloration, with longer bills and darker heads, but the under-surface still pale. The head in the female is not as boldly striped as in the male. Type in the British Museum.

GENUS—L A Z U L E N A .

LAZULENA, nov. Type *L. macleayi*.

SMALLEST Dacelonine birds with long stout bills, long wings, long tails and small legs and feet and peculiar coloration.

The bill is long with the culmen keel flattened, the edges entire, the under mandible with an upward tendency. The coloration of the bill above is black, the basal part of the lower mandible horn. The wing is long with the secondaries short: the tip consists of four primaries the first equal to the fourth, the second and third a little longer, subequal and longest.

The tail is long and rounded with little graduation.

The feet are small and delicate, the tarsus and toes scutellate.

The sexes show slight but striking differences in coloration.

In order to determine exactly the affinities of the Australian "Halcyons" it has been necessary to review the whole of the species so classed by Sharpe, the latest monographer, in the *Catalogue of the Birds in the British Museum*. I publish here the results of my criticism and hope that these may be of use to the younger school of Australian ornithologists. I have always had before me in the preparation of this work the idea of making available to this younger school facts and fancies not easily achieved by the lonely worker in the Antipodes. I have received thanks from some of these earnest truthseekers who have added to the facts and thereby helped the fancies with which we delve into the past ornithological history of Australia. I here make these comments as it appears that in so doing I have offended some of the older ornithologists who would have wished to remain content in their ignorance and who have written objecting to my technicalities asserting that Australian ornithology was complete when they had done their little bit. It will never be complete as long as man lives.

The separation of the species lumped by Sharpe in the genus *Halcyon* seems a very necessary task but one which might well dismay the boldest worker. To reconstitute an intricate series which has been split by many workers only to be reassociated by less skilful followers is to court criticism. Lumping is an easy matter; splitting is much more difficult especially when the species are very similar in design and structure. It necessitates a review of the attempts to disassociate and reconstruct the group.

THE BIRDS OF AUSTRALIA.

In 1821 Swainson introduced *Halcyon* as supplementary to *Dacelo* proposed by Leach in 1815. As type of *Halcyon* Swainson designated *Alcedo senegalensis* Linn., though figuring Latham's *Alcedo collaris*.

Simultaneously Horsfield proposed the name "*Entomotheræ* '*Chasseurs*'" as a group name in connection with *Alcedo coromanda* Latham. The succeeding year he amplified his remarks describing the sections in detail. Of the first section *Alcedo* typical he stated: "*Alcedo ispida* furnishes a sample of this genus." The second he also diagnosed concluding: "The *Alcedo sacra* furnishes a sample of this genus." He continued with *Dacelo* and *Entomothera* and observed: "The propriety of these views, as far as regards the division of *Alcedo*, of the earlier ornithologists into two genera, is confirmed by the author of the *Zoological Illustrations*, William Swainson, Esq. In the Fifth Number of this work, the second genus is described with the name of HALCYON, while ALCEDO is applied to the first, and the characters of both genera are clearly defined. In the Museum of Joshua Brookes, Esq., of Blenheim Street, the second genus is distinguished by the name of ENTOMOPHILA, from the Manuscripts of Dr. Leach." It seems that *Entomophila* may be determined as an alternative name, and therefore equivalent to *Halcyon*, and that its type may be regarded as *A. senegalensis* Linn., and that we may legitimately disregard Horsfield's "sample" of *A. sacra* in this connection.

In 1827 Lesson after collecting Indo-Pacific birds, proposed the new genera *Syma*, *Melidora* and *Todiramphus*. The first named is very distinct and we have already dealt with it: the second is a well-marked genus which does not enter into this review: the third was introduced for the flatbilled island species, two only being attached, *T. sacer*=*Alcedo sacra* Gmelin etc. of Lesson not accurately of Gmelin, and *T. divinus* sp. n.

In 1830 in his *Traité* Lesson proposed the new genus name *Alcyon* for *Alcedo* L. et Auct., an introduction which seems to have been overlooked, as it is not quoted in the *Catalogue of the Birds in the British Museum*, Vol. XVII., nor in Waterhouse's *Index Generum Avium*.* Miller has stated the complications surrounding the type of *Alcedo* as they appeared in 1912, but had he known of this further complex he might well have been puzzled. As it is, the matter has been apparently decided that *A. ispida* designated by Lesson himself in 1828 is the type of *Alcedo*. The above was quoted by Miller, but Swainson in the *Zoological Illustrations*, Ser. I., pl. 26, 1821, had previously definitely named the same species as type before he introduced his genus *Halcyon*. Accepting *A. ispida* as the type of "*Alcedo* L. & Auct.," this

* Since this was in the printer's hands Richmond's third list of Generic Names applied to Birds has been received; and therein (*Proc. U.S. Nat. Mus.*, Vol. 53, p. 575, Aug. 6, 1917) is recorded "*Alcyon* Lesson, Type *Alcedo alcyon*, Linnaeus tautonymy," with a footnote.

My own view above given would seem to be the most accurate, but I leave the matter for better judgment.

LAZULENA.

must also be recognised as the type of the substitute name *Alcyon* Lesson, which moreover is anticipated by Swainson's *Halcyon*, which is the correct spelling.

Of his genus Lesson recognised eight subgenera, *Ceyx*, *Alcedo*, *Syma*, *Tanysiptera*, *Dacelo*, *Choucalcyon*, *Melidora* and *Todiramphus*. Of these only *Choucalcyon* was new and this was proposed for *C. gaudichaldi* ex Q. & G. and *Choucalcyon australe* = *Dacelo gigas* N.S.W. This was through a misinterpretation of *Dacelo* Leach and in 1837 Lesson himself (*Compl. de Buffon*, Vol. IX., Oiseaux, p. 355) declared that *Dacelo gigas* was the type of *Choucalcyon*. I have already dealt with this under the genus name *Dacelo*.

In 1848 began the era of subdivision in this group. Kaup then broke into the genus *Ceryle* which had been introduced for large peculiarly coloured Kingfishers by Boie in 1828. Kaup's splitting did not touch any of the species here dealt with so we need not develop his action.

Bonaparte in 1850, however, separated as genera *Halcyon*, *Todiramphus* and *Actenoides*. The former was subdivided into four sections, *Paralcyon*, *Halcyon*, *Cancrophaga* and *Calialcyon*. The first name was untenable, having been proposed by Gloger in 1827 in a different sense. Bonaparte's species of *Halcyon* did not contain Swainson's type while his *Cancrophaga* did and the tautonymic type is probably founded on a phase of *senegalensis*. His *Calialcyon* was given to the species which formed the basis of Horsfield's *Entomothera* of nearly thirty years before. Consequently none of these names are available.

Under *Todiramphus* Bonaparte ranged the Australian species *sancta* Vigors and Horsfield, *sordida* Gould, *pyrrhopygia* Gould and *macleayi* Jard.

Actenoides was taken from the plate published in connection with the *Voy. Pole Sud*, but which was there accompanied with a vernacular name only. This name is valid.

The next year Reichenbach added several names, of which *Monachalcyon* and *Chelicutia* show interest. The former was proposed on p. iv. for *gaudichaudii* Q. & G. and *princeps* nov. I have discussed the complication about the former under the genus name *Dacelo* previously but will again refer to it later. The type of *Chelicutia* is the species *A. chelicuti* and the latter spelling must be revived as Sharpe's emendation to *chelicutensis* is inadmissible. The dates given in the *Catalogue of the Birds in the British Museum*, Vol. XVII., show printer's and other errors and are somewhat confusing. Thus in the first line 1834 should be 1814 and in the fifth 1823 should be 1820.

In 1854 Bonaparte added in the *Consp. Vol. Aniso*, p. 9, *Cyanalcyon* for the *pyrrhopygia*, etc., series, separating these from *Todiramphus*. The

THE BIRDS OF AUSTRALIA.

following year Gray designated the above-mentioned species as type. The invalid names already mentioned were continued.

In 1860, Cabanis and Heine in the *Mus. Hein.*, Theil. II., made a big clearance, proposing new names and separating new groups. They acted judiciously as a general rule, but in the determination of types they did not always accept the final designation of previous systematists. On grounds of purism they proposed *Pagurothera* for *Chelicutia* Reichenbach, and *Carcineutes* for *Lacedo* Reichenbach. The two later names are, at present, absolute synonyms. They corrected Reichenbach's misuse of *Entomothera* by introducing *Entomobia*, of which *A. fusca* Boddaert must be regarded as the type. In a similar way they invented *Sauromarptis* for *Choucalcyon* Bonaparte 1854 not of Lesson 1831. They added *Caridagrus* for *concretus* Temminck alone, *Astacophilus* for *lindsayi* Vigors alone and *Caridonax* for *fulgidus* Gould alone. These are all necessary. They ignored Gray's selection of *pyrrropygia* and restricted *Cyanalcyon* to *macleayi*, introducing the new genus *Sauropatis* for *sancta*, *chloris*, *pyrrhopygia*, etc.

In 1869 Gray admitted these groups as subgenera only of *Halcyon* under that genus name recognising, *Halcyon*, s. str., *Chelicutia*, *Entomobia*, *Calialcyon*, *Hylcaon*, *Pelargopsis*, *Cyanalcyon*, *Sauropatis*, *Todiramphus*, *Caridagrus*, *Astacophilus*, *Actenoides*, *Lacedo*, *Caridonax* and *Syma*. Though most of the Gray subgenera have been constantly since recognised as of generic value confusion was here shown when Sharpe treated this series. Thus *Hylcaon* and *Pelargopsis* were synonymised and placed in a distinct subfamily *Alcedininæ*, *Syma*, *Lacedo* and *Todiramphus* generically separated and the remainder sank as absolute synonyms. Rectifications of nomenclature have since been made but no real criticism of the grouping.

In his *Birds of Australia* Gould included in the genus *Halcyon* the species *sanctus*, *pyrrhopygia*, *sordidus*, *macleayi* and *flavirostris*. Immediately afterwards genus-splitting became the vogue and therefore Gould, who was essentially a splitter, whether of genera or species, followed suit and in his "Handbook" ranged the above species in three genera, *Todirhamphus*, *Cyanalcyon* and *Syma* eliminating *Halcyon* altogether.

Under the first-mentioned genus name Gould explained: "The members of this genus are more numerous and more widely dispersed than the *Dacelæ*. The range of the various species extends from Asia, through the Indian Islands, to Australia; but I believe no one of them has yet been found in Africa. In making this statement, I wish it to be understood I do not intend to say there are no Kingfishers in that country; on the contrary, they are very numerous there, but not of this particular form. Some of them bear a very general resemblance to it, and one of these is the type of the genus *Halcyon*,

LAZULENA.

in which the Australian *Todirhamphi* have hitherto been placed." Under *Cyanalcyon* he added: "They are all highly coloured, and differ but little from the *Todirhamphi*, with which they have been hitherto associated."

Sharpe, retrogressively replaced the Australian species in the genus *Halcyon* and in the *Catalogue of the Birds in the British Museum*, Vol. XVII., separated *Halcyon* from *Todirhamphus* by such a character as—

" Bill compressed	..	..	..	..	..	<i>Halcyon</i>
Bill flattened	..	..	..	..	..	<i>Todirhamphus</i> ."

The range of the former genus was given: "From Palestine and Asia Minor to Persia. Throughout the whole of Africa and the Australian and Indian Regions to China, the southern islands of Japan, and Manchuria." Fifty-three species and many subspecies were recognised: while *Todirhamphus* was restricted to the "South Sea Islands, Samoan and Society Islands," four species being allotted thereto.

Sharpe's conclusions were accepted as against Gould's, the monographer being considered as more likely to be correct than the general student. In the present case, however, it appears that the monographer had indulged, in this case, in lumping, a rare failing in such a worker.

In his "*Revision*" Miller did not deal with this case of lumping in detail, though apparently aware of the heterogeneity of the genus as he wrote: "The variation in the primary formula of *Halcyon* is most remarkable. The tenth primary is in some species much shorter than the first, while in others the tenth and ninth are equal and longest. There are doubtless few if any other genera of birds in which this range of variation is equalled. There is little doubt, however, that this large genus of over eighty forms, by far the largest in the family, is divisible into at least two genera, as it includes both eutaxic and diastataxic groups, and there are also differences in form and coloration. . . . While the question of generic distinction in the *Alcedininæ* and *Daceloninæ* is beyond the scope of the present paper, some random remarks on the subject suggest themselves and a few characters often overlooked in systematic works may be mentioned. The very large and dominant genus *Halcyon* is remarkable not only for the great number of species (three or four times that of *Tanysiptera*, the next largest genus of *Daceloninæ*) and wide geographical distribution (the only genus of the subfamily found in Africa, where it is well represented), but also for the striking variations in the relative length of the primaries and the presence or absence of the fifth secondary. *Halcyon* is evidently a generalised form and approaches the other subfamilies more closely than any other genus of its group. In the absence of a backward process to the lacrymal it differs from *Dacelo* and *Ramphalcyon* (and doubtless other genera) agreeing with *Alcedininæ* (*Alcedo* at least) and the *Cerylinæ* It

THE BIRDS OF AUSTRALIA.

is obvious that *Halcyon* and *Todirhamphus* are very closely related, while *Dacelo*, *Choucalcyon*, and probably *Clytoceyx* form a natural group, but the exact positions of the remaining genera (of the *Daceloninae*) is a question for future determination."

Miller pursued (p. 274): "The majority of large groups of birds (orders or suborders) are consistently either eutaxic or diastataxic, without any exceptions as far as they have been examined. (Birds which have the fifth secondary present are termed eutaxic or quintocubital and when this quill is missing the terms diastataxic or aquintocubital are used.) In only three families are both styles of wing known to occur. These are the *Columbidae* (*Peristeridae* of Sharpe), the *Alcedinidae* and the *Micropodidae*. In the Pigeon and Swifts the character always coincides with the limits of currently recognised genera but varies with the subfamilies. . . . There remains in the Kingfishers only a single genus containing both forms of wing. This is the large and polymorphic *Halcyon* the species of which fall into several minor groups, differing remarkably in the wing-formula as well as in the form of the bill and in coloration, and the character of the fifth secondary holds good in each of these sections as far as it has been investigated. . . . Mitchell uses generically the name *Sauropatis* for the four diastataxic species examined by him. As *Halcyon* is at present the only genus among birds known to contain both styles of wing, there is little doubt that when this character is determined in all the species it will be practicable and desirable to recognise generically one or more of the many names, including *Sauropatis*, currently synonymised under *Halcyon*."

In Mitchell's essay (*Ibis* 1901, p. 97), only a few species were examined so that while we can accept the four species he names, *chloris*, *sancta*, *sordida*, *vagans*, as being diastataxic there would be little reason for considering them congeneric without further confirmation. As a matter of fact Mitchell's results show once again the value in systematics of careful skin examination as these four are obviously congeneric to a genus splitter from consideration of superficial features alone. They were associated by Cabanis and Heine when he introduced *Sauropatis* and the association has since been recognised by Gray, Salvadori, etc. Unaware of Miller's work and quite independently I had examined the Australian "*Halcyon*" as to their generic affinities and in the *Austral Avian Record* Vol. I, Dec. 24, 1912 (Miller's paper was only published in New York on Sept. 12, 1912) I had concluded, p. 108,

"*Sauropatis* Cabanis und Heine, *Mus. Hein.*, Vol. II., p. 152, 1860.

Type, *Halcyon sanctus*, Vigors and Horsfield

and

Cyanalcyon Bonaparte, *Consp. Vol. Aniso*, p. 9, 1854.

Type (by sub. desig.) *Halcyon pyrrhopygia* Gould ;

LAZULENA.

must be utilised in place of *Halcyon*, the type of which by original designation is *H. senegalensis* (Linné).

Examination of the type of *Halcyon* shows that the Australian Kingfishers have little affinity with the African ones, and so that Australian ornithologists can see the differences I have had the accompanying cuts prepared. Whereas the African birds have the culmen curved and depressed towards the tip, the Australian ones have the culmen tending in an upward direction, the under mandible thereby becoming differently formed; in the former the first primary is much shorter than the second, whereas in *Sauropatis* it is very nearly the same length, and in *Cyanalcyon* it is absolutely the longest. There can be little doubt that we are here dealing with distinct forms, and that the African name cannot be correctly utilised for the Australian birds. As a matter of fact the latter would be better placed in *Todirhamphus* than in *Halcyon* by genus lumpers."

I can now call upon Mitchell's record of the diastataxic wing for the absolute recognition of *Sauropatis* but we still have *Cyanalcyon* and *Todirhamphus* to deal with. Both these names have priority over *Sauropatis* and while the latter might be dismissed on account of its peculiar flat bill and round wing formation, the former does not show such distinctive characters. Nevertheless I shall endeavour to show hereafter that slight superficial characters must be grasped for the differentiation of the generic groups in this family even as Miller has used them in the American etc., *Cerylinæ*. The most casual examination shows that subdivision of *Halcyon* is most necessary so that an attempt is here made with that perplexing subject. In connection with it the species classed under *Todiramphus* must be considered as these are certainly more closely related phylogenetically to the so-called Australian "*Halcyon*" than the latter are to the true "*Halcyon*." Further, even as Sharpe and Miller concluded, colour is of higher value in this family than structure. This is well seen in the *Todiramphus* series where the colour change has been slight but the structural alteration (for the family) great. A first consideration of the group shows up some interesting points, such as the coincidence of general coloration with geographical range. Thus African species generally show a greenish-blue as the predominant colour, yet in this colour-group two or more structural groups are combined. In the the Moluccas a beautiful purple colour scheme is seen alongside a greenish-blue, which latter is quite a distinct grouping from the African one. Coincident with these larger groups, isolated minor groups occur, and a careful consideration suggests these are as old or older than the larger ones. The exact relationship of some of these minor groups is not at all clear but here again I would undoubtedly class colour as of much higher value than structure. The most prejudiced

THE BIRDS OF AUSTRALIA.

student would be fain to confess this were he to *study* this group. After reading Miller's *Revision*, I feel sorry that he did not continue his analysis of the Kingfishers through the "genus" *Halcyon* as it would have been a most valuable contribution to our systematic knowledge of birds. Sharpe's *Halcyon*, which was accepted with reservation, is quite unacceptable, the synonymy given being sufficient indication of the heterogeneous nature of the assemblage. He did not separate the genus into sections but arranged them by means of coloration so that the phylogenetic alliance was not at all indicated, unless that should depend on coloration. Gray in 1869 had suggested the relationships of the species by classing them in subgenera and I note *Halcyon* s. str. ranged over Africa and into Arabia, *Chelicutia* Africa alone, *Entomobia* from Asia Minor through India to China and the Philippines, Java and Borneo; *Calialcyon* India to Celebes and Japan; *Cyanalcyon* Celebes to North Australia and Solomon Islands, and Tonga; *Sauropatis* Australia, New Zealand, India through Moluccas to Tonga, Feejee and Philippines; *Todiramphus* Society, Friendly and Samoan Islands; *Caridagrus*, Sumatra, Java and Borneo: *Astacophilus* and *Actenoides* Philippines. These groups are fairly natural but most should be generically utilised, good anatomical characters having already been put forward in the cases of *Calialcyon*, *Sauropatis* and *Todiramphus*. . . It is suggested that even better characters might be found in the cases of *Caridagrus* and *Actenoides*.

However, to particularise, the type of *Halcyon* is *senegalensis* L., and this species is typical of an African group, the structural features of which I have already given. In addition the coloration is characteristic. It should be here noted that there is little difference throughout the group in the nature and size of the small feet, the wings are proportionately alike but good characters exist in the proportion of the primaries: the tail is generally medium, graduated so that a short-tailed species attracts especial attention. The bill is long and generally of such a breadth, height and depth that a more depressed broader bill, shorter rounder bill, or deeper compressed bill emphasises a colour distinction. Further, a generic value seems to be expressed in the coloration of the bill, a majority having the mandibles differently coloured, a few unicolor red, some unicolor black. It is valuable from a systematic view-point when the coloration and shape of the bill coincides with a distinct style of coloration which is emphasised by a peculiar wing-formula and such groups are here considered as of generic value and are designated as such.

The coloration of *senegalensis* (*Halcyon* s. str.) can be roughly given as follows: Upper coloration generally greenish-blue: a black shoulder-patch,

LAZULENA.

and primaries black with a white bar across their bases, concealed by upper coverts. Under-surface white with grey mottling more pronounced on the breast. There is a black eye-stripe. The tail is long, rounded with little graduation. The bill is particoloured, the upper mandible red, the lower black. Sexual difference, as known, slight; female probably duller. Immature with head darker and under-surface more speckled. The wing formula reads: first primary about equal to the secondaries and the seventh primary; the third longest, the second equal to the fourth and the fifth little shorter. A species known as *senegaloides* agrees with the preceding as regards general coloration, but has the bill longer and broader and all red. This last feature is noteworthy, as a series exists in which the same general coloration is retained and the bill is still particoloured, but an appreciable increase in size has taken place, especially noticeable in the bill. The chief variation in coloration is the more extensive black shoulder-patch and the deeper bluish freckling on the under-surface. The wing-formula has, however, altered somewhat, the first primary being shorter than the eighth, the second longer than the sixth, with the third, fourth, and fifth subequal and longest. In the *Catalogue of the Birds in the British Museum* four forms are ranged *Halcyon torquatus*, subsp. *forbesi*, subsp. *malimbicus* and species *dryas*. The relationships seem all subspecific, with *malimbicus* as the species name. We have here then at our first examination a series showing little or no colour change, yet appreciable alteration in size, accompanied by a difference in wing-formula and also in bill and feet proportions. Further, while these have retained the particoloured bill there exists a small species with the bill all red. The large forms deserve recognition subgenerically, so I propose the new subgenus HALCYONOPA and name *Halcyon dryas* Hartlaub as type. This genus and subgenus are confined to Africa, and these give no clue to the original form and coloration of the group. The next, however, seems to indicate this.

Alcedo chelicuti Stanley is a small Halcyonine bird with a very short (for the family) narrow bill, showing little keeling and dull blackish-red coloration, lower mandible paler. The head is *striped*, an indistinct collar at the back of the head, the scapulars are brownish, the primaries brown, the secondaries greenish-blue, the upper wing-coverts brownish with pale spots. The back is turquoise-blue, the tail greenish-blue. There is a blackish eye-stripe. The under-surface is white at the throat, tinged with buff to a greater or less extent below, and the breast-feathers with the shaft-stripes black, and edges tipped with brown, the longitudinals predominating.

The immature resemble the adults, but are duller and more strongly marked on the under-surface. The wing-formula is peculiar: the first

THE BIRDS OF AUSTRALIA.

primary is long, much longer than the secondaries and equal to the fifth primary; the second, third and fourth are subequal and longest. Obviously *Chelicutia* is a valid genus distinct from *Halcyon*, and the succeeding series show its peculiarities more clearly.

Alcedo albiventris Scopoli shows colour-evolution in a strange manner: though a larger bird, the immature show their under-surface to be very similar to that of *Chelicutia*, the breast-streaks being prominent. The head is brown showing indistinctly striping, there is a brownish-white collar, the upper-surface otherwise brownish, even the tail; but the back is greenish-turquoise, while the secondary patch is dull greenish. The legs are longer than in the preceding. The female differs little from the immature, the head showing the striping still indistinctly, and the chest-streaks are becoming obsolete. The male has developed a bright colour: the head is distinctly striped: a black shoulder-patch encroaches on the secondary-coverts and scapulars: back and tail and secondary patch greenish-blue. Structurally this shows similarity to the type of *Halcyon*, the bill being quite like that of that species, but the legs are weaker: the wing is rounded, quite unlike that of *Chelicutia*, the first primary being shorter than the secondaries and the ninth primary, the other primaries being not very much longer, the second, third, fourth and fifth being subequal and longest. This could not be placed in *Chelicutia* from structural features, though the coloration suggests its close relationship. Neither can it be classed in *Halcyon*, as its colour denies its close alliance and suggests the similar structure to be due to convergence in evolution. I therefore propose the new genus name CHELICUTONA for this species alone.

A still more puzzling species is the *Halcyon semicæruleus* of the *Catalogue of Birds*. The correct specific name is *leucocephala* Müller. The immature shows it to be a derivative from the ancestral stock of the preceding. The breast markings are dissimilar only because the shaft stripes have nearly entirely disappeared and the brown tips predominate: the abdomen is deep buffy: the throat white: the head lacks stripes, and the black shoulder-patch tends to extend over the scapulars as in the preceding: the back, secondary patch and tail bright blue, developing at times and places a mauve tone. The adult male has the colours clearer, deeper and better defined, the breast markings having disappeared. Structurally the bill is longer, narrower and more compressed, the feet are very delicate, while the wing-formula is as in the preceding.

In view of the similarity in structure and coloration, this species may be classed with the preceding in preference to *Halcyon*, but it is possible that later anatomical characters may demand its separation.

LAZULENA.

It may here be explained that in this essay I do not develop the methods employed by Miller in his "*Revision*" where he has given calculations of the ratio of certain items. Had these been prepared they would have undoubtedly emphasized the facts herewith exposed, but these seem sufficient, especially if the birds are examined from a careful and unprejudiced point of view. It is difficult to show by means of figures the differences seen in the bills of the groups of Kingfishers as this feature has become so generalised: while the same remark applies to the feet, the small tarsus and peculiar toe formation being very general and featureless. The wing is also long with little graduation. As regards structure, there is more difference in *Halcyonopa* and *Halcyon* than would appear between *Halcyon* and *Chelicutia*, while the truth is the two former are very closely allied, the two latter distantly related.

Alcedo coromanda Linné is the most interesting species in the group. Although included in *Halcyon* its appearance instantly denies the association. Its subspecies have recently been determined by Oberholser (*Proc. U.S. Nat. Mus.*, Vol. 48, pages 639-657, May 18, 1915), who used for it the generic name *Entomothera*, concluding: "The present species is without doubt generically distinct from *Alcedo senegalensis* Linnæus, the type of *Halcyon* Swainson. It differs as follows: Bill much larger in every way (relatively as well as actually); exposed culmen about half the length of the wing instead of much less: tip of culmen more distinctly decurved; gonys more upcurved; culmen less sharply ridged; gonys less sharply keeled; scutellæ of tarsus much smoother; and first (outermost) primary much shorter than the seventh, at most not longer than the eighth." Previously, anatomical writers as Beddard and Mitchell had conceded generic rank to the species using the name *Calialcyon*. No one that I have noted has drawn attention to the correct association of the species, namely, with *Ceyx*; and its transference from the *Dacelonidæ* follows. I would then conclude that the Ceycine species would include this, and that a subfamily (? family) *Ceycinae* be recognised. To support this conclusion I draw attention first to the colouring, which is like that of the "red Ceyces," then the bill features, next the feet, and lastly the wings. It is strange that so obvious an association was not hitherto proposed: apparently the size of the species and the presence of the hind toe have been the factors, but these are not comparable with the above. Thus the bill agrees in size with that of *Halcyonopa* but is distinguishable by its flatter Ceycine formation, the lower mandible being also shallower: it agrees in proportion to the wing with that of *Halcyonopa*. The tarsus is weakly or obsoletely scutellate, showing its alliance with the unscaled

THE BIRDS OF AUSTRALIA.

podotheca of *Ceyx*. The Dacelonine birds have the tarsus roughly scutellate, the toes especially so.

Alcedo smyrnensis (Linné) is a larger bird with a long deep all red bill, not so broad for same length as in *Halcyonopa*, more keeled and compressed. The tail is long, not much graduated, with the feet large, the tarsus very short. The wing has the first primary about equal to the secondaries and less than the ninth primary, the four next almost equal, the second slightly shorter, sometimes the third, sometimes the fourth appearing longest. The coloration appears fixed, the immature and female being the same as the male, but duller. The head is deep red-brown, as the whole of the underparts, save throat and upper breast. The rest of the upper-surface greenish-blue, the primaries brown and a shoulder-patch of black excepted. There is a closely allied species, *gularis*, which has the white below restricted to the throat, and the black wing patch more extensive.

A very different looking bird is the very rare *cyaneiventris* Vieillot of Java. The head in the adult is black, succeeded by a deep red-brown collar. The scapulars are purple-blue, the secondary stripe greenish-blue, as is the tail: the black shoulder-patch is present. Underneath the throat is deep red-brown, and the rest of the under-surface purple-blue. The wing-formula agreed with that of *smyrnensis*, and fortunately immature were available which showed the nestling to have a dark reddish-brown head, a white throat and dark reddish-brown under-surface, proving absolutely this species to be a further evolution from the *smyrnensis* stock, and though apparently so differently coloured truly congeneric. This group was called *Entomobia* by Cabanis and Heine, that name being proposed for *Entomothera* as used by Reichenbach but not *Entomothera* of Horsfield. I note, however, that *Entomobia* is preoccupied by A. G. Costa, 1846, so that a new name is necessary for this well-marked genus. I herewith propose PLESIALCYON gen. nov. and designate *Alcedo smyrnensis* Linné as type.

Halcyon badia Verreaux is a peculiarly puzzling species as we have no clue to its origin. It has peculiar coloration, being red-brown above and white below, the back is turquoise-blue and there is a greenish-blue secondary-patch, the colour of the tail. The immature is similar, but shows dark fringes to the feathers of the chest. The wing-formula is not abnormal: the first primary is equal to the secondaries, shorter than the ninth primary: the third, fourth and fifth are longest and subequal, the third probably the longest, the second longer than the sixth. The bill is all red, short and broad, more conical in shape than other members of the group. The tarsus is also proportionately shorter. I

LAZULENA.

have been unable to associate it with either *Halcyon* or *Chelicutia* so here propose NUTCHERA gen. nov. for this species alone. It may be that it is a peculiar evolution from the *Chelicutia* stock, and it might be a derivative from the ancestors of *smyrnensis*, but it decidedly differs at present from either.

Another aberrant singleton is *Alcedo pileata* Boddaert. This large species has a black head, white nape collar, black shoulder-patch and black primaries. The secondary patch, scapulars, back and tail are purple-blue. The underparts are white throat, succeeded by buffish-orange: sometimes the white extends on the chest which appears to be a sexual character: the immature agrees but black fringes are seen on the breast-feathers. The bill is long and red and shows obsoletely minute serrations on the edges. The wing-formula slightly differs, the first primary being longer than the secondaries and equal to the seventh primary: the third and fourth primaries are equal and longest, the second exceeding the fifth. In size this species agrees with *smyrnensis* and has been hitherto associated with it when groups have been utilised. The wing-formula, however, separates it and it is necessary to propose the new genus name CECILIA for this species alone. Its superficial upper resemblance to *cyanei-ventris* Vieillot appears coincidental: the latter species Oberholser placed in *Entomothera* with which it has no near relationship.

A most interesting series is the one represented in the *Catalogue of the Birds in the British Museum*, under the names *Halcyon cinnamominus*, subsp. *ruficularis*, subsp. *mediocris*, species *reichenbachii* and *australasice*. Judging from colour these are obviously closely related to *Syma*, differing in lacking the serrated edges to the mandibles. I would not class the latter item alone as of higher value than coloration and would attach the *Syma* group to these wherever they be placed. They certainly cannot be separated as in Sharpe's classification, and I would only grant this "*Halcyon*" series a low value as against *Syma*. However, once more they show the higher value of coloration when contrasted with other structural features. Thus in addition to the serrated edges of the bill *Syma* has developed a more wedge-shaped tail. In the "*Halcyon*" series above noted two phases occur and both should be differentiated. *Alcedo australasia* Vieillot is a smaller bird with the tail little graduated: a long compressed bill and the wing-tip composed of four primaries much longer than the secondaries: the first primary is longer than the fourth, the second and third a little longer and subequal. *Halcyon cinnamomina* Swainson is a larger bird with similar tail, but bill broader, more depressed like that of *Todiramphus*: the secondaries are long and little exceeded by the primaries, the tip consisting of six or seven primaries, the first about

THE BIRDS OF AUSTRALIA.

equal to the seventh, the second equal to the fifth, and the third and fourth subequal, but little longer. There is thus as much difference in structure between these two as between these and *Syma*. The logical sequence is the recognition of each generically, and I therefore propose ANTISYMA, with *Alcedo australasia* Vieillot as type, and HYPOSYMA, with *Halcyon cinnamomina* Swainson as type. In coloration there is a series in the former showing the loss of the coloured crown, which lacking in the latter, is a sexual feature in *Syma*, though here also it is showing decrease in the subspecies. Further, the bill in *Syma* has developed in most races a wholly red colour, whereas in the former it is always parti-coloured.

A well defined group is the *macleayi* series. For this species, *Halcyon macleayi* Jardine and Selby, I here propose the genus name LAZULENA. This is the *Cyanalcyon* of Cabanis and Heine, but not of Bonaparte as fixed by Gray. The striking coloration is peculiar, and it is accompanied by a strange colour difference in the sexes and no difference in the immature plumage. Structurally this series has shorter, more conical bills than *Halcyon*, with the culmen flattened and the feet more slender and delicate: the bill is constantly black, with the basal portion of the lower mandible whitish.

The wing has the tip consisting of four primaries with the secondaries short: the first primary is about equal to the fourth and little exceeded by the second and third, which are longest and subequal. The tail is long with little graduation. The sexual colour differences are extraordinary: in one species, *leucopygia*, it consists of a white rump in the male, the female having a purple-blue one: in *macleayi* the male has a white collar on the hind neck which is not present in the female: in *diops* a further phase is seen as the white collar of the male is missing in the female, which has then developed a blue band across the chest. Still a different scheme is seen in *lazuli*, which has apparently no white collar above in the male, but closely examined the bases are seen to be white. The lower surface shows the throat and breast white in the male, the abdomen greenish-blue: in the female the throat only is white, the breast and abdomen greenish-blue. A rare species, *farquhari* Sharpe, belongs to this group, but according to the sexed series available there is no difference in the sexes: this species shows a black head, all the above having purple-blue heads, a white collar above, white throat and all the breast and abdomen deep buff-red. A species which I have not seen, *Halcyon albonotata* Ramsay, appears referable here, but the sexes do not appear to be known: its white back seems a good specific feature.

LAZULENA.

Another closely allied series of purple-backed Kingfishers again show structural differences, while the colour has not essentially changed. They are bigger birds with broader, stronger bills, still of the same coloration as those of *Lazulena*, with the tail longer and more graduated. The wing-formula is essentially different, the first primary being short and the secondaries being long, exceeding it in length: the first primary is less than the ninth, the second a little longer than the sixth, the third, fourth and fifth subequal and longest, but not greatly exceeding the second. The best known species is *Halcyon nigrocyanea* Wallace, and I name this as type of the new genus DILAZULA. The immature has a black cap, blue circle at nape, black mantle and primaries: the wing-coverts dark bluish, the tail deep blue: the back is bluish and there is a black streak below the eyes: the throat is white and the rest of the under-surface is brown. The female has the head blue, generally black above, the wing-coverts purplish-blue and the tail deep purple: the back is turquoise: the under-surface is all white with a blue band across the chest. In the male the purple-blue extends over the secondaries and partly over the scapulars, while the under-surface has the throat white, and spot on the breast white, the rest all blue.

Cyanalcyon stictolæma Salvadori is closely related, the chief difference being the lack of white in the under-surface of the male. *Cyanalcyon quadricolor* Oustalet seems to show the above immature plumage as a fixed feature, a blue band across the chest being seen above the red-brown. In *nigrocyanea* this blue band appears first while the brown of the abdomen is still present. Berlepsch's record that the female of *quadricolor* is like the female of *nigrocyanea* is probably wrong: if it were correct a peculiar case of reversion would be presented: the sexes should show exactly the opposite: that is, the red-bellied birds should be females and the white-bellied ones the males, in which case *nigrocyanea* is the most recent evolution.

It is probable that another species, *Halcyon winchelli* Sharpe, though differing little in structure and not a great deal in coloration has had a different source, and that the apparent similarities are due to convergence. There is not, however, sufficient material and evidence to separate this species generically, so I class it with the preceding, but propose for it the new subgeneric name DILAZULENA as the bill is differently shaped: the red loreal spots and red nuchal collar are distinctive: the upper-surface is more purplish above and the under-surface is buffy, whiter on abdomen, while specimens are known with the under-surface white, but whether this be sexual or due to immaturity is not yet known.

The largest series of "Halcyonine" birds is the *Todiramphus-Cyanalcyon-Sauropatis* group. Throughout this series the coloration is fairly uniform,

THE BIRDS OF AUSTRALIA.

the sexes differ little, and the wing-formula is rather constant. The coloration of *Cyanalcyon* separates this group, while the wing-formula and short depressed bill characterises *Todiramphus*. It is again peculiar that the type of *Sauropatis sanctus* should have the wing a little more pointed. Thus the first primary is very long, usually longer than the fourth and scarcely exceeded by the second and third, while the secondaries are very short. In the majority of the allied species, such as *chloris*, *sordidus*, *sacer*, and their subspecies and allies, the first primary is generally less than the fourth but longer than the fifth, while there is little difference in the length of the second, third and fourth primaries.

The adult coloration is, generally, head blue-green; a black eye-stripe, a white collar, white underneath, and greenish-blue above. The species differ in size, more or less brighter blue above and more or less buffy below. The female may have the feathers of the breast with dark tips, which is the immature plumage; the coloration above also being duller, more brownish-green. The feet are small, the tail long with little graduation: the bill is blackish with white basal patch of lower mandible: there is a distinct tendency of the upper mandible upwards, while the culmen keel is more or less flattened.

The bill may be longer and narrower or broader: when it becomes short, broad and depressed the genus *Todiramphus* is achieved. The *Sauropatis* series is characterised by the diastataxic condition of the wing. It does not appear to have been yet recorded whether *Todiramphus* or *Sauropatis* have the wing of this style, but I don't think there should be any doubt from colour and structure.

Halcyon saurophaga Gould is of this affinity, but its white head, large size, and huge bill indicate that it deserves subgeneric separation, and I therefore introduce for it and its allies the new subgeneric name LEUCALCYON. The wing-formula is not very dissimilar, the first primary being longer than the fifth, the second longer than the fourth, the third longest. The long strong bill is almost half the length of the wing, a ratio not approached in any of the smaller species.

An anomalous species is *Todiramphus funebris* Bonaparte, later classed by the same worker in *Cyanalcyon*, by Gray in *Halcyon*, later in his subgenus *Sauropatis*, by Schlegel in *Dacelo*, and then in *Sauropatis* generically by Salvadori. It agrees generally in style of coloration with *Sauropatis*, but the upper coloration is dark brown, the head black. It may have sprung from the *Sauropatis* stock, but differs so decidedly in coloration that I separate it generically as a new genus MELANALCYON. The bird is similar structurally, but the first primary, though longer than the secondaries, is exceeded by the

LAZULENA.

sixth primary, the second primary being equal to the fifth, while these are little exceeded by the third and fourth which are subequal and longest. The immature and female are duller above than the male, and the former as a nestling has the white feathers of the nuchal collar and the underparts tipped with blackish-brown. This indicates an early distinction from true *Sauropatis*, as these have only the breast-feathers tipped and generally a buffish tinge in the young.

The four last species classed by Sharpe in *Halcyon* were *H. hombroni*, *concretus*, *lindsayi* and *moseleyi*. Then followed the genus *Todiramphus* with four species, *T. veneratus*, *youngi*, *recurvirostris* and *tutus*. The four former are widely separated from the *Sauropatis* series while the four latter seem nearly related to that group, so I will deal with these first.

T. veneratus auct, *youngi* and *tutus* auct are in agreement structurally, while *T. recurvirostris* differs. All agree in having short depressed bills of the *Sauropatis* coloration and this has been regarded as a good generic character. In the *History of the Collections in the Natural History Departments of the British Museum*, Vol. II., published in 1906, Sharpe gave the results of his criticism of the drawings prepared by Forster and Ellis, artists who accompanied Cook on his Second and Third Voyages.

By means of these paintings Sharpe was enabled to correct the misinterpretation of the names *Alcedo tuta* and *venerata* both of Gmelin. Apparently previous to this date Sharpe had never read the descriptions given by Latham on which Gmelin based his names, as the error is certain from these alone. On p. 182 in connection with pl. 58 of Forster's series Sharpe wrote: "Both the 'Venerated' and 'Respected' Kingfishers of Latham seem to be the same species, and hence *Todiramphus tutus* Sharpe (*nec* Gm.), *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 291, will require another name, which I propose should be *Todiramphus wiglesworthi*, in memory of the young explorer who did such good work as the historian of the Pacific Avifauna." This correction and name have not been recorded, as Sharpe omitted this important series of papers from the *Zoological Record* for 1906, which he prepared. Hence I here emphasise the changes: *Todiramphus tutus* Gm. = *veneratus* Gm. = *veneratus* Sharpe, *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 288, and *Todiramphus wiglesworthi* Sharpe 1906 = *T. tutus* Sharpe (*nec* Gm.), *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 291.

Though these species differ in the adult plumage in rather a distinct manner, it seems that the immature of *T. wiglesworthi* corresponds in coloration with the adult of *T. tutus recte*. This adult plumage is very similar to that of the *Sauropatis* group, but the immature is different.

THE BIRDS OF AUSTRALIA.

Consequently this may be the oldest form. The wing-formula is of the true island form, very round and showing lack of flight power. Thus, the first primary is shorter than the ninth primary and secondaries, the others not much longer, the second equal to the fifth, the third and fourth longest and subequal, but the whole four very nearly the same length. The tail is long, but little graduated. *T. youngi* seems a weak form of *T. tutus*.

T. recurvirostris is quite in agreement as to bill characters, save that the upward tendency is a little more exaggerated. The wing is round, but the wing-formula disagrees notably with the above, the first primary being longer than the sixth and also the secondaries, the second longer than the fifth, and the third and fourth longest. In coloration this species agrees with the *Sauropatis* (s. str.) group, and I have little doubt it is a recent island derivative of the *sanctus-vagans* series. Specimens of the latter from the northern islands show the same upturning of the bill, and in some cases a noticeable broadening and depression, so that its nearest allies would seem to be this group and not true *Todiramphus*. I propose to distinguish this species as a new genus **TODALCYON**.

It is remarkable that we should have such a complex series of Kingfishers on these islands where true *Sauropatis* also occurs. Thus *Sauropatis sacer* agrees closely with *recurvirostris*, save in the form of the bill, and I should conclude that probably this divergence is due to the different times at which the birds arrived at the islands, and would be a strong argument in favour of the greater antiquity of coloration as against structure.

The last four species of "*Halcyon*" are extraordinarily interesting from the view-point of a student of colour-evolution. They are large birds, with peculiar style of coloration, the wing-coverts being spotted is a striking feature. One species has developed a short tail, as a recent feature, having apparently evolved from a long-tailed stock.

The species *Actenoides hombroni* Bonaparte seems to show the oldest coloration. The immature and female appear to be much alike, and have the head greenish, a nuchal collar, buff bases with black tips, the wing-coverts green with pale fawn spots at the tips, the back turquoise, the long tail greenish: the under-surface, white throat, rest buffy, the breast feathers with black tips. The adult male has the head blue, a blue moustachial streak below the eyes from the bill, otherwise as in preceding, but with the colours clearer, the tail blue, the nuchal collar defined as black, buff, and black tipped, a triple colour series; a very old male has the edges on the under-surface obsolete and the spotting on the upper-surface weaker. Structurally the bill is large, somewhat *Sauropatis*-shaped, the

LAZULENA.

culmen ridge dark, the rest paler, yellowish-horn colour. The legs are strong, coarsely scutellate in front of the tarsus, reticulate behind with sides unscaled. The wing is long and rounded, the first primary shorter than the ninth and secondaries, the second less than the sixth, the third, fourth and fifth subequal and longest. The genus *Actenoides* should never have been submerged in *Halcyon* as the characters are very strong and peculiar.

Dacelo lindsayi Vigors was separated by Cabanis and Heine with the generic name *Astacophilus*, but here I cannot see any need for distinction. The coloration is of the same style, the differences seen being only specific as can be easily gauged from the allied species *Actenoides moseleyi* Steere. There is no difference in structure, the bill being similar, the wing-formula corresponding, and the tail equally as long. From the view-point of a genus-splitter, superficially the three seem strictly congeneric and can all be classed in *Actenoides*.

The fourth species, *Dacelo concreta* Temminck, shows the same style of coloration, the female being quite similar to the female of *hombroni*, but the male has preserved the green head while losing the wing-coverts and scapular spotting. The wing-formula is similar, but the tail is very *short*. This peculiarity obtained generic distinction for the species by Cabanis and Heine, who named it *Caridagrus*, and this name should be used. It shows that colour can be practically retained during the shortening of the tail to a very appreciable extent.

A species recently described by Rothschild, *Halcyon bougainvillei*, may be a further evolution from the *Actenoides* stock, in which the head has become buffy and the wing-covert spotting totally lost. By placing it in *Halcyon* all clues to its relationships are hidden, and its correct systematic position must remain unknown until it is studied by a careful systematist.

I would here comment that the *Monachalcyon* series admitted as a distinct genus by Sharpe, show three distinct generic types. The bird I have called *Dacelalcyon confusus* has the first primary short, the second less than the sixth, the third, fourth and fifth longest and subequal, all the primaries narrow. The coloration is peculiar, and so suggestive of immaturity in its barring above and below that it was at first regarded as the juvenile of the next species, *monachus*, which is a larger bird with a long keeled compressed upper mandible, wing rounded with broad primaries, the first very short, much less than the secondaries, the second less than the ninth, the third about equal to the seventh, the fourth, fifth and sixth subequal and longest. The feet are strong. The coloration is quite unlike that of the preceding.

THE BIRDS OF AUSTRALIA.

The other species, *fulgidus* Gould, has the genus name *Caridonax* proposed by Cabanis and Heine available, and this should be used. In addition to its distinct coloration, the tail is longer and more graduated, the bill is noticeably less keeled and the wing-formula differs. The first primary is little less than the secondaries and equal to the eighth primary, the fourth longest, the third equal to the fifth, the second equal to the sixth.

The genus *Halcyon*, as catalogued in the *British Museum Catalogue*, would then be split up into many, as follows:—

Entomothera coromanda (Latham) must be altogether removed from the family and placed alongside *Ceycopsis* in the family *Alcedinidæ*; I suggest a subfamily *Ceycinæ* for the “red Ceyces” whether three or four-toed, and further anticipate it may later have family rank.

Nutchera is proposed for *Halcyon badia* Verreaux alone. Its exact relationships are unknown, and it lacks the white basal primary bar found throughout the succeeding five series.

Plesialcyon is introduced for *Alcedo smyrnensis* Linné, *Entomobia*, proposed by Cabanis and Heine, being preoccupied. Additional species are *Alcedo gularis* Kuhl and *Alcedo cyanoventris* Vieillot. Though the latter is superficially different, the plumage changes prove it to be a true relative of *smyrnensis*.

Cecilia is proposed for *Alcedo pileata* Boddaert. This was included by Cabanis and Heine in *Entomobia* but, though having a superficial resemblance to that genus, shows structural differences as well as those of colour that demand separation.

Chelicutia should be utilised for *Alcedo chelicuti* Linné, and *Chelicutona* is added for *Alcedo albiventris* Scopoli and here is admitted *Alcedo leucocephala* Muller = *semicæruleus*, *Catalogue of Birds*. The former genus is well characterised by coloration, size and structure, while the latter seems a derivative which has altered in coloration, size and structure, so that it approaches the next in these details, but cannot be regarded as congeneric.

Halcyon will be preserved for its type species *senegalensis* Linn., the species *irroratus*, *Catalogue of Birds* = *senegaloides recte* being included as well as the *torquatus* series, which are regarded as being subgenerically separable with the name *Halcyonopa*.

In the *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 249, the *saurophagus* group follows, but this I regard as a subgenus of *Sauropatis*, to which I have given the name *Leucalcyon*.

The next series is my genera *Lazulena* and *Dilazula*. Then followed *Halcyon pyrrhopygius*, the type of *Cyanalcyon*. Interposed between this

LAZULENA.

and *Sauropatis*, which I believe to be its nearest ally, the *Syma*-coloured species for which I have proposed the genera *Hyposyma* and *Antisyma*.

The succeeding species and subspecies Nos. 33 to 48, pp. 262-282, I class in *Sauropatis*, while *Halcyon funebris* (Bonaparte) constitutes my genus *Melanalcyon*.

Actenoides would include Sharpe's *Halcyon hombroni*, *lindsayi* and *moseleyi*, while *Caridagrus* would be available for Temminck's *concretus*.

Todiramphus is divisible into two genera, *Todiramphus* and *Todalcyon*, and must come into consideration with the preceding forms.

A natural grouping of the species would differ in arrangement from the preceding, and it is possible that genera not treated of here would become involved were a thorough systematic study made of the Order. This sketch is a preliminary outline of the analysis necessary before reconstitution can be prepared. Thus, were genus-lumping to be indulged in, many obstacles occur. The colour-groups *Lazulena* and *Actenoides* show discord with the rest, while the "*Syma*-coloured" species form a striking item. Half a dozen times structure is seen to be younger than coloration, and in each case in a different direction. Thus *Todiramphus* is separated from *Sauropatis* by its short, flattened bill. *Syma* has stood unchallenged on account of its serrated bill edges. *Monachalcyon* has been admitted apparently because of its longer legs. In *Todiramphus* two different styles of wing occur. In *Halcyon* the same thing occurs repeatedly in differently coloured groups, while we have three structural groups with the same coloration in *Syma*, *Antisyma* and *Hyposyma*; the latter from structural characters should be classed with *Todiramphus*, the bill formation as well as the wing-formula approaching this group.

In whatever manner the species comprising the genus *Halcyon* in the *Catalogue of the Birds in the British Museum*, Vol. XVII., be approached it cannot be regarded as anything save heterogeneous, and five distinct groups are distinguishable after the elimination of *Entomothera*. These would be *Halcyon*, *Lazulena*, *Cyanalcyon*, *Actenoides* and *Antisyma*. With *Cyanalcyon* would be associated *Todiramphus* and *Antisyma* would be classed near *Syma*.

The above would be absolutely necessary were my other groups degraded as subgenera.

Without much more study, including anatomical research, the phylogenetic relationships must remain more or less obscure. I suggest *Chelicutia* as the nearest the ancestral form from which sprang *Chelicutona*, *Halcyon*, *Halcyonopa* and perhaps *Plesialcyon*.

From a similar stock independently evolved *Cyanalcyon*, *Sauropatis*,

THE BIRDS OF AUSTRALIA.

Leucalcyon, *Melanalcyon*, *Todiramphus* and *Todalcyon*. Another stock produced the *Syma-Hyposyma-Antisyma* series, and this may be allied to the *Actenoides-Caridagrus* development. *Melidora* may represent a phase in the latter, as I note the nestlings of all this series have the bill hooked at the tip.

I consider *Lazulena* and *Dilazula* as a higher phase evolved from the *Sauropatis* ancestry.

It is imperative to remember that the peculiar development in this Order has duplicated similar structural features over and over again. It is possible that anatomical inquiry would lay some of these developments bare, as instance, the relationship of the *Syma* series.

I might observe that the serrated bill edges of *Syma* are obsoletely seen in other species, as instance, *Alcedo cyanoventris* Vieillot, while its long wedge tail is equalled in *Cittura*, a genus admitted by Sharpe in the *Catalogue of the Birds in the British Museum*.



Roland Green. del.

Witherby & Co

$\frac{1}{5}$

CYANALCYON MACLEAYII.
(FOREST-KINGFISHER).

Order *ALCEDINIFORMES*.

Family *DACELONIDÆ*.

No. 389.

LAZULENA MACLEAYII.

FOREST KINGFISHER.

(PLATE 337.) *

HALCYON MACLEAYII Jardine and Selby, Illustr. Ornith., Vol. II., pl. 101, 1830 : Moreton Bay, Queensland (formerly part of New South Wales).

Halcyon macleayii Jardine and Selby, Illustr. Ornith., Vol. II., pl. 101, 1830 ; Gould, Birds Austr., pt. XI. (Vol. II., pl. 24), 1843 ; Ramsay, Ibis, 1865, p. 84 (Q.) ; Diggles, Ornith. Austr., pt. II., 1866 ; Sharpe, Monogr. Alced., p. 207, pl. 78, 1870 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878 ; Sharpe, Zool. Rep. Coll. Alert, p. 24, 1884 (N.Q.) ; Ramsay, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. I., p. 1097, 1886 ; (N.W.A.) ; *id.*, *ib.*, Vol. II., p. 166, 1887 (N.T.) ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; *id.*, Cat. Austr. Alced., p. 13, 1894 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 254, 1891 ; Hall, Key Birds Austr., p. 57, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 556, 1901 ; Mathews, Handl. Birds Austral., p. 54, 1908 ; Ingram, Ibis, 1908, p. 466 (N.T.) ; North, Austr. Mus. Spec. Cat. No. 1, Vol. II., p. 366, 1909 ; Macgillivray, Emu, Vol. X., p. 217, 1910 (N.Q.) ; Broadbent, *ib.*, p. 235 (N.Q.) ; G. F. Hill, *ib.*, Vol. XII., p. 256, 1913 (N.T.) ; Agnew, *ib.*, Vol. XIII., p. 95, 1913 (Q.) ; Macgillivray, *ib.*, p. 160, 1914 (N.Q.) ; H. L. White, *ib.*, Vol. XVI., p. 219, 1917 (N.T.) ; Campbell and Barnard, *ib.*, Vol. XVII., p. 17, 1917 (N.Q.).

Halcyon incinctus Gould, Synops. Birds Austral., pt. IV., App. p. 1, 1838, Moreton Bay, Queensland (formerly N.S.W.) ; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 142, Dec., 1838.

Todiramphus macleayi Bonaparte, Consp. Gen. Av., Vol. I., p. 157, 1850.

Cyanalcyon macleayi id., Consp. Voluer. Aniso, p. 9, 1854 ; Gould, Handb. Birds Austr., Vol. I., p. 133, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 583 (Q.) ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 (Q.) ; *id.*, *ib.*, Vol. II., p. 270, 1878 (N.T.).

Dacelo macleayii Schlegel, Mus. de Pays Bas, Alced., Vol. III., p. 40, 1863.

* The Plate is lettered *Cyanalcyon macleayii*.

THE BIRDS OF AUSTRALIA.

- Halcyon sancta* (nec Vigors and Horsfield) Diggles, Orn. Austr., pt. II., pl. only, 1866.
Halcyon barnardi Campbell, Emu, Vol. X., p. 338, 1911: Lockerbie, Cape York;
H. L. White, *ib.*, p. 340 (N.Q.); Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.).
Halcyon macleayii macleayii Mathews, Nov. Zool., Vol. XVIII., p. 288, 1912.
Halcyon macleayii barnardi Mathews, *ib.*
Halcyon macleayii distinguendus Mathews, *ib.*, South Alligator River, Northern Territory.
Halcyon macleayii publa Mathews, Austral Avian Record, Vol. I., p. 38, 1912: Melville Island.
Cyanalcyon macleayii macleayii Mathews, List Birds Austr., p. 148, 1913.
Cyanalcyon macleayii barnardi Mathews, *ib.*
Cyanalcyon macleayii distinguendus Mathews, *ib.*
Cyanalcyon macleayii publa Mathews, *id.*, *ib.*
Halcyon macleayii caeruleus Ashby, South Austr. Ornithologist, Vol. I., pt. I., p. 20, Jan., 1914:
Port Keats, Northern Territory.

DISTRIBUTION. New South Wales; Queensland; Northern Territory.

Adult male. Crown of head very dark purplish-blue; upper back, wings, and tail dark ultramarine blue; scapulars, lower back, and central upper tail-coverts inclining to cobalt-blue with a wash of green on the scapulars; inner webs of primary and secondary quills blackish edged with white on the basal portion of the four outer primaries, the remainder banded with white on both webs; lores, sides of face, and ear-coverts black; a large white supra-loral spot; a white collar on the hind neck which encroaches more or less on to the base of the feathers on the nape, some of the feathers slightly tipped with blackish; chin, throat, and entire under-surface white including the axillaries and under wing-coverts, the flanks slightly tinged with pale isabelline, under-surface of quills glossy brown, white on the inner basal portion; lower aspect of tail blackish-brown. Eyes brown; feet and tarsi brownish-black. Bill black, basal half of lower mandible whitish. Total length 210 mm.; culmen 33, wing 91, tail 59, tarsus 14. Figured. Collected on Melville Island, Northern Territory, on the 25th of June, 1912.

Adult female. Lacks the white nuchal collar, the colour of the head taking its place.

Immature. Have the nuchal collar and the spot above the eye cinnamon, head black with brown margins to the feathers, back greenish-brown, under surface tinged with buff.

Nest. A hollowed-out white ants' nest (placed in a tree).

Eggs. Clutch, four to six. White and roundish. 23 to 24 mm. by 20 to 21.

Breeding-season. October to December.

GENERALLY of a more northern habitat than the commoner Kingfishers, this beautiful species was named from a specimen with no definite locality, and on account of the difference in the coloration of the sexes Gould described, a few years later, the female as a new species. He indicated New South Wales as the locality of his new form and, to avoid confusion, this locality was designated as the type locality of the earlier name. By this means Gould's name became an absolute synonym, as he himself denoted.

FOREST KINGFISHER.

Gould's notes are the most complete yet offered and, as little has since been added, I here quote them. He wrote: "There has not yet been discovered in Australia a more beautiful Kingfisher than the one dedicated to the late Alexander MacLeay by the authors of the 'Illustrations of Ornithology' as a tribute of respect for his scientific labours, in the propriety of which I entirely concur.

"The extreme brilliancy of the plumage of this bird would indicate that it is a native of the hotter portions of the country, and the correctness of this inference is borne out by the fact that it inhabits all the eastern provinces from Moreton Bay to the extreme northern portions of the continent; it is tolerably abundant at Port Essington, and it is also spread over nearly every part of the Cobourg Peninsula suited to its habits; like the other members of the genus to which it belongs, it is rarely, if ever, seen near water, and evinces so decided a preference for the forests of the interior that it has obtained the name of 'Bush Kingfisher' from the residents at Port Essington; it is generally dispersed about in pairs, and feeds on small reptiles, insects, and their larvæ; its general note is a loud *pee-pee*, uttered with considerable rapidity. It incubates in November and December, sometimes forming its nest in the hollow trunks of trees, and at others excavating a hole for itself in the nest of the tree-ants, which presents so prominent and singular a feature in the scenery of the country; the nest of the *C. Macleayi* is easily discovered, for, on the approach of an intruder, the birds immediately commence flying about in a very wild manner, uttering at the same time a loud piercing cry of alarm. . . . So much difference exists in the plumage of the sexes, that Gilbert states he was for some time induced to regard them as specifically distinct—an error into which I had myself previously fallen when describing the female as a new species. . . . 'but upon closer observation,' adds Gilbert, 'I soon satisfied myself that the difference of plumage was merely sexual, the dissection of a large number of specimens fully proving that those with a ring round the neck are males and those without it females.' "

Mr. J. P. Rogers sent me the following notes from Melville Island: "Cooper's Camp. November 5, 1917. This is the common Forest Kingfisher here at present, and is usually found in the forest, but at times is seen on the edges of the mangroves. During the past month I have seen many birds making holes in termites' nests up to fifty feet from the ground. On the 6th November a nest with five eggs was found, and a hundred yards away another termite's nest with a hole in it was seen: this contained one egg, and when I examined it several days later the nest was abandoned and the egg destroyed. January 13, 1912. Locality: 10 miles S.E. of Snake Bay.

THE BIRDS OF AUSTRALIA.

This species is very numerous on the great swamp, also in a large belt of pandanus which fringes the outer edge of the swamp of the north-eastern side: these pandanus are on the side of a ridge about fifty yards from the edge of the swamp and extend for about two miles along the swamp and are about a hundred yards through. On the great swamp this species lives in part on fish. I saw two flying into the water and thought they were bathing: while watching them I saw one swallow something. I therefore shot it, and on dissection found one small mullet about $1\frac{1}{2}$ inches long, and bones and scales of other fish in the stomach, as well as fragments of insects. These birds do not fish like the *Alcyone*, but flew to the surface of the water in a slanting direction, and merely seem to dip the beak and perhaps their head into the water: in fact, the whole action resembled the catching of a small lizard or other prey on land where the bird often flies down, seizes its prey, and returns to the perch without alighting on the ground."

Captain S. A. White has given the following item: "I have met with this bird in the great forest country of South Queensland and New South Wales. Their habits are like many other members of the family. Their call is loud and harsh. I have seen these birds perched upon a dry tree, calling every six to eight minutes over a period of hours: food consists of insects, lizards, etc."

Mr. Edwin Ashby has written me: "This Kingfisher was common in the forest land north of Brisbane and also in the open clearings in the scrub land of the Blackall Ranges. The old birds were feeding their fledged young at the end of September. The garrulous cries of the young made one of the most prominent sounds of the bird life of the bush."

Mr. J. W. Mellor also noted: "This bird I have seen plentiful in the forest country of the upper parts of New South Wales and in Queensland, where it is known as the Forest Kingfisher: it breeds in the large white-ant mounds that are high up in some lofty forest tree, and almost inaccessible to the climber. They burrow out a hole, making a larger cavity inside, and there lay four round pearly white eggs with a highly-polished surface to the shell. I saw numbers of the birds in the Blackall Ranges, Queensland, while there in October and November, 1910. Their food seemed to consist of small fish from a stream close by, but chiefly insects and grubs, etc., caught in the damp leaves and undergrowth of the scrub and forest."

Macgillivray wrote (*Emu*, Vol. XIII., p. 160, 1914): "Noted all the way down the Cloncurry River. At Cape York they were numerous in the open forest all the year round, nesting in termites' nests on the trees at an average height of from 30 to 40 feet. The usual nesting-time is from October until the end of the year. A full clutch consists of five eggs, though a smaller number is often found. At Lockerbie, when he was examining a nest

FOREST KINGFISHER

containing four heavily-incubated eggs, the birds attacked Mr. M'Lennan savagely."

There appears to be little else recorded of the life-history of this species, so that it only remains to deal with the subspecific forms. The first to be published was by A. J. Campbell, who wrote (*Emu*, Vol. X., p. 338, 1911): "*Strange Halcyon*. Another of Mr. Harry Barnard's interesting discoveries in the rich region of Cape York has been an apparently new Kingfisher, which nearest resembles *Halcyon macleayi*, but is different owing to its darker-coloured head and the absence of the conspicuous white bars on the wings. . . . At present the type is solitary, but should more examples prove the foregoing description to be constant, no doubt ornithologists will readily agree that the bird be named the Barnard Kingfisher (*Halcyon barnardi*) after its discoverer, Mr. H. G. Barnard—one of the Barnards of 'Coomooboolaroo' fame." Barnard himself does not appear to have been confident regarding this "new species," as his notes read (*Emu*, Vol. XI., p. 24, 1911): "A Kingfisher, closely resembling *Halcyon macleayi*, was obtained by me, and on the skin being forwarded to Mr. A. J. Campbell, was said by him to be new. . . . Several pairs of these birds were seen. Their habits resemble those of *H. macleayi*."

In the preparation of my "Reference List" I had to determine the relationship of this supposed "new species," and upon examining the collections I noted that the Cape York *macleayi* really differed in their slightly darker coloured heads, and in some specimens the white wing-bar was reduced as to be almost missing, but no accurate worker at the present time would consider such minute and inconstant features as specific. Campbell and Barnard have recently been discussing Rockingham Bay birds in the *Emu*, Vol. XVII., pp. 2-38, 1917, and particularly dealt with the question, "What are species and what subspecies?" Without attempting to go into detail, it can be confidently replied that "*Halcyon barnardi* (Campbell) is NOT a species, but at the best an ill-defined subspecies." A conservative worker, sometimes quoted with respect to subspecific distinctions by Australian students, Mr. Ogilvie-Grant, denies it even the lowest value, as I will quote hereafter.

However, while examining the species, I noted the western subspecific form was very distinct, and therefore recognised

Halcyon macleayii macleayii Jardine and Selby. South Queensland;
New South Wales.

Halcyon macleayii barnardi Campbell. North Queensland.

Halcyon macleayii distinguendus

"Differs from *H. m. macleayii* in its slightly smaller size and darker

THE BIRDS OF AUSTRALIA.

coloration on the head, and having the humerals and rump of a bright brilliant blue.

South Alligator River, Northern Territory.

Northern Territory."

When Rogers sent me the Melville Island birds he remarked that these seemed to be typical *H. macleayi* as he knew it from the north-west, the form I had named *H. m. distinguendus*. Upon comparison, I found that these did differ from the adjacent continental bird, so named them

"*Halcyon macleayi publa*

"Differs from *H. m. distinguendus* in having the back and humeral greenish-blue, and in its smaller bill.

Melville Island."

The distinction of the Western form was amply confirmed by its independent description by Mr. Edwin Ashby in the *South Australian Ornithologist*, Vol. I., pt. I., p. 20, January, 1914, as "*Halcyon macleayi caeruleus* subsp. n. The Northern Forest Kingfisher. The specimen described hereunder was obtained at Anson Bay, Northern Territory. This subspecies is easily distinguished from its congener, *H. macleayi*, by its much more intense and brilliant blue coloration, the green shades of the latter are entirely absent and the white collar of the hind neck is more marked in the species under review. . . . Further investigation may show this bird to be identical with *Halcyon macleayi distinguendus* Mathews."

In my "List" published at the end of 1913 I recognised the genus *Cyanalcyon* and there admitted four subspecies: *C. m. macleayi*, *C. m. barnardi*, *C. m. distinguendus*, and *C. m. publa*.

As the species occurs outside Australia, it has been treated by extra-limital workers, but with little profit, as good series were not available. Thus, dealing with one specimen from the Mimiki River, Ogilvie-Grant (*Ibis*, Jubilee Supplement, No. 2, December 1915, p. 215) wrote: "The wing measures 88 mm., and is rather smaller than that of most Australian examples, but two specimens collected by F. Strange in Queensland measure respectively 88 and 89 mm. On the other hand, a bird from south-east New Guinea measures 93 mm., and others from Fergusson Island are equally large. In one Queensland bird the wing measures 96 mm. Mr. Mathews distinguishes four subspecies of *H. macleayi* in Australia, but even with the help of his series I fail to recognise more than one [cf. "List of the Birds of Australia," p. 148, (1913)]. The type specimen of his *H. m. distinguendus* from South Alligator River, which he has kindly sent me for examination, certainly has the back and scapulars unusually blue, but other examples from North Australia (Port Darwin

FOREST KINGFISHER.

and Port Essington) do not differ from typical *H. macleayi*. The differences in colour are probably entirely due to wear, the back and scapulars being blue in freshly moulted birds and becoming more or less verditer-green as the plumage becomes worn."

These remarks are somewhat inaccurate, a feature usually seen in Ogilvie-Grant's latter work. First he absolutely ignores Campbell's *H. barnardi*, though the majority of skins available to him were labelled Cape York. He then insinuates that he examined my series; which was not so. He asked for and passed over the type of *H. m. distinguendus*, though a specimen from Port Essington did confirm it. He was also unaware of Ashby's independent recognition of the blue coloration which is quite distinct from the verditer-green of typical birds. Every Australian ornithologist who compares these will admit this. The typical birds are never bright blue, but in the freshest plumage are verditer-green. Perhaps Ogilvie-Grant was confused by the New Guinea specimens, which, probably exemplifying different races, show variation. Little value was apparently given to distance, climatic conditions or natural boundaries, when south-west New Guinea, south-east New Guinea and Fergusson Island specimens were lumped together in an essay dealing with subspecific forms. When good series are examined, these will prove to be three distinct subspecies. I have examined individuals in connection with my own good lot of Australian birds, and I unhesitatingly still recognise four subspecies in Australia, thus:

Lazulena macleayii macleayii (Jardine and Selby). South Queensland:
New South Wales.

As noted above, New South Wales was determined as type locality on account of Gould's *Halcyon incinctus*, an absolute synonym, being recorded from that locality. It should, however, be altered to South Queensland, as it is fairly certain from Gould's later remarks that the specimens came from Moreton Bay, at that time called New South Wales. Campbell and Barnard have recently recorded *Halcyon macleayi* from Rockingham Bay, North Queensland, indicating that these should be by me called *Cyanalcyon macleayi barnardi*, observing: "Common: They appeared to be typical 'Macleays.'" Again a lost opportunity for the revision of the "species" *H. barnardi* Campbell, as undoubtedly the Cairns birds belong to the same subspecies as the Cape York form, according to my specimens.

Lazulena macleayii barnardi (Campbell). North Queensland.

Lazulena macleayii distinguenda (Mathews). Northern Territory.

Of this subspecies *Halcyon macleayii caeruleus* Ashby is completely a synonym. I note that H. L. White records Northern Territory birds as

THE BIRDS OF AUSTRALIA.

"*Halcyon macleayi* (*Cyanalcyon macleayi barnardi*)," (*Emu*, Vol. XVI., p. 219, 1917) without comment.

Lazulena macleayii publa (Mathews). Melville Island, Northern Territory.

Lazulena macleayii, subspp. ?? New Guinea, etc.

More than one subspecies will later be determined as extra-limital representatives of the Australian species.

It is now necessary to discuss *A. diophthalmo-rufo-ventro* Hombron and Jacquinot, *Ann. Sci. Nat. (Paris)* Series II., Vol. XVI., p. 315, Nov., 1841. Here a "Mâle adulte" was described from "Vavao (archipel de Tonga)." No species of *Lazulena* being known from this group, Sharpe placed the name in the synonymy of the present species, as the balance of characters suggested this course. It was compared to *lazuli* Temminck and *diops* Temminck, and the general upper coloration agrees with these species as with *macleayi*: but it differs from all three in the feature "ventre roux," while it has the neck azure, a character of the female *macleayi* but *not* of the male. In the full account of the birds of the *Voy. Pole Sud*, prepared by Jacquinot and Pucheran, this species does not appear, and no one appears to have written anything about the type since. At the present time it is impossible to make search for it, so that the name must stand over, but cannot yet be admitted into the synonymy of the Australian species. It may be recorded that Hombron and Jacquinot called at Raffles Bay, Northern Territory, and thence to New Guinea through Torres Straits. In the *Catalogue of Birds Tropical Islands Pacific Ocean*, p. 7, 1859, Gray proposed the new name *Halcyon* (*Actenoides* ?) *jacquinoti* to replace the unwieldy combination offered by Hombron and Jacquinot. It is possible that Hombron and Jacquinot's species may still be recovered as, since Sharpe's first determination, a fine new species *H. farquhari* Sharpe has been described from New Ireland, which has the under-surface save the throat reddish-brown, and which may be the nearest ally of the lost species.

Another name admitted as a synonym in the *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 254, 1891, by Sharpe, is "*Cyanalcyon lazulinus* (nec T.), *Bp. Consp. Vol. Aniso.*, p. 9, 1854." At the entrance quoted, "*lazulinus* Schiff" appears as a *nomen nudum*, and its reference here is not definite, as Bonaparte admitted *lazuli* Temm. and *macleayi* J. & S. at the same time. It is quite a distinct name to *lazuli* Temm., so that Sharpe's bracket (nec T.) was erroneous as there was no "*lazulinus* T."

Ogilvie-Grant did not discuss the fact that Berlepsch had previously distinguished (*Abhandl. Senckenb. Naturforsch. Gesellsch.*, Bd. XXXIV., 1911, p. 75) the Aru Island form as a new "conspecies," *Halcyon macleayi*

FOREST KINGFISHER.

insularis, writing: "*H. H. macleayi* dicto valde affinis sed minor, alis imprimis brevioribus, necnon dorso coeruleo-cyaneo, nec viridescente coeruleo lavato distinguendus." It should be noted that Berlepsch cited as the type locality of Jardine and Selby's *Halcyon macleayi*, Port Essington, North Australia, the specimen being stated as "Coll. A. Macleay in Linnean Society Coll." There seems to be no valid reason for this selection, as the species was described in 1830, some years before the settlement of Port Essington, and Gould has told us it was not uncommon around Moreton Bay, an easily accessible locality.

GENUS CYANALCYON.

CYANALCYON Bonaparte, *Ateneo Italiano*, Vol. 2,
No. 11, p. 319 (*Consp. Volucrum Aniso.* p. 9),
August, 1854 Type *C. pyrrhopygius*.

SMALL Dacelonine birds with long slender bills, long wings with short secondaries, long tails and small legs and feet, characterised by very distinct coloration.

I have given details of this genus in connection with the preceding, but may here note that though it stands alone in coloration it may be related to the next group and, were these to be united, the above genus name has priority. The coloration is so peculiar, however, that I unhesitatingly maintain it as a distinct genus, as I have shown coloration to be the most constant factor in Kingfisher evolution, as far as this family is concerned. It then becomes another of the extraordinary endemic Australian forms, as it is restricted to Australia, and, moreover, is missing from Tasmania and the extreme south-west of Australia.

Probably the most remarkable feature of this genus is the pointed wing, the first primary being absolutely the longest: in *Sauropatis*, the first primary is slightly shorter than the second, though sometimes nearly equalling it, while in *Lazulena* the first primary is long. In the other groups referred to *Halcyon* in the *Catalogue of the Birds in the British Museum*, the first primary is generally short. If *Cyanalcyon* be regarded as a very near ally of *Sauropatis*, the elongation of the wing in conjunction with a restricted habit is a very peculiar item. No other relationship can at present be suggested, and the slender bill is not exactly like the bills of the *Sauropatis* series.



Roland Green del.

Witherby & Co

$\frac{2}{5}$

CYANALCYON PYRRHOPYGIUS.
(RED-BACKED KINGFISHER).

CYANALCYON PYRRHOPYGIUS.

RED-BACKED KINGFISHER.

(PLATE 338.)

HALCYON PYRRHOPYGIA Gould, Proc. Zool. Soc. (Lond.) 1840, p. 113, 1841: Interior New South Wales.

Halcyon pyrrhopygia Gould, Proc. Zool. Soc. (Lond.), 1840, p. 113, 1841; *id.*, Birds Austr., pt. I. (Vol. II., pl. 22), 1840; Diggles, Orn. Austr., pt. XXI., 1870; Sharpe, Monogr. Alced., p. 211, pl. 79, 1870; Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 380, 1877 (Q.); Ramsay, *ib.*, Vol. II., p. 179, 1878; *id.*, *ib.*, Vol. VII., p. 45, 1883 (N.S.W.); *id.*, *ib.*, 2nd Ser., Vol. I., p. 1086, 1886 (N.W.A.); *id.*, *ib.*, Vol. II., p. 166, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 3, 1888; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 258, 1892; Ramsay, Cat. Austr. Alced., p. 9, 1894; Hall, Key Birds Austr., p. 57, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 557, 1901; Hall, Emu, Vol. II., p. 49, 1902 (N.W.A.); Le Souëf, *ib.*, p. 151, 1903 (N.T.); Carter, *ib.*, Vol. III., p. 96, 1903 (N.W.A.); Berney, *ib.*, Vol. VI., p. 44, 1906 (N.Q.); Ingram, Ibis, 1907, p. 401 (N.T.); Mathews, Handl. Birds Austral., p. 54, 1908; Whitlock, Emu, Vol. VIII., p. 189, 1909 (W.A.); Mathews, *ib.*, Vol. IX., pp. 6/58, 1909 (N.W.A.); *id.*, *ib.*, p. 68 (N.T.); North, Austr. Mus. Spec. Cat. No. 1, Vol. II., p. 369, 1909; Gibson, Emu, Vol. IX., p. 75, 1909 (W.A.); Whitlock, *ib.*, p. 193, 1910 (W.A.); G. F. Hill, *ib.*, Vol. X., p. 271, 1911 (N.W.A.); *id.*, *ib.*, Vol. XII., p. 256, 1913 (N.T.); Witmer Stone, Austr. Av. Rec., Vol. I., p. 152, 1913; Chandler, Emu, Vol. XIII., p. 37, 1913 (Vic.); Macgillivray, *ib.*, p. 160, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.); Cheney, *ib.*, p. 207, 1915 (Vic.); H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

Todiramphus pyrrhopygia Bonaparte, Consp. Gen. Av., Vol. I., p. 157, 1850; Gould, Handb. Birds Austr., Vol. I., p. 130, 1865; Ramsay, Ibis, 1866, p. 327 (N.Q.); *ib.*, Proc. Zool. Soc. (Lond.), 1875, p. 582 (Q.); Masters, Proc. Linn. Soc. N.S.W., Vol. II., p. 270, 1878 (N.T.).

Cyanalcyon pyrrhopygia Bonaparte, Consp. Volucr. Aniso., p. 9, 1854.

Sauropatis pyrrhopygia Cabanis and Heine, Mus. Hein., pt. II., p. 161, 1860.

Dacelo pyrrhopygia Schlegel, Mus. de Pays Bas, Alced., Vol. III., p. 39, 1863.

Halcyon pyrrhopygius pyrrhopygius Mathews, Nov. Zool., Vol. XVIII., p. 288, 1912.

Halcyon pyrrhopygius obscurus Mathews, *ib.*: Parry's Creek, North-west Australia.

Halcyon pyrrhopygius utingi Mathews, Austral Avian Record, Vol. I., p. 118, 1912: Cape York, Queensland.

THE BIRDS OF AUSTRALIA.

Cyanalcyon pyrrhopygius pyrrhopygius Mathews, List Birds Austr., p. 149, 1913.

Cyanalcyon pyrrhopygius obscurus Mathews, *ib.*

Cyanalcyon pyrrhopygius utingi Mathews, *ib.*

DISTRIBUTION. Queensland; New South Wales; Victoria; South Australia; Northern Territory; North-west Australia; Mid-West Australia.

Adult male. Head brown streaked with white and tinged with bluish-green: a supraloral streak, which is continued over the eye on to the sides of the crown and extended round the nape, white with black hair-like tips to the feathers; lower eyelid white; lores and hinder face, including the ear-coverts, black continued in a narrow line round the back of the nape which is followed by a broader collar of white; mantle, wings, and tail dull blue; some of the greater upper wing-coverts slightly tipped with whitish; primary- and secondary-quills brown on the inner-webs which are edged with white, the secondaries edged with whitish at the tips; scapulars inclining to green with silky-white bases to some of the feathers, which gives a more or less streaked appearance; back, rump, and upper tail-coverts chestnut; tail-feathers margined with white on the inner-webs; the outermost pair much paler and edged with white on both webs; throat, breast, abdomen, under tail-coverts, and under wing-coverts white; axillaries dull blackish; under-surface of quills whitish pale brown on the apical portion; lower aspect of tail pale brown with paler edgings to the feathers. Eyes black; feet dark grey; bill black, base of lower mandible whitish. Total length 210 mm.; culmen 37, wing 100, tail 72, tarsus 15. Figured. Collected at Cape York, North Queensland, on the 16th of August, 1912.

Adult male. Head dark brown, the feathers, which are much elongated, fringed with white, giving a streaked appearance and tinged with bluish-green; supraloral streak white, which is continued over the eye along the sides of the crown and meets on the nape where it forms a concealed white patch, many of the feathers, especially above the eye, have black hair-like shafts; lores, eyelids, hinder face, and ear-coverts black, which is continued round the back of the neck where it forms a collar, this is joined by a whitish collar tinged with chestnut, most especially in the middle of the hind neck, and minute blackish tips to the feathers; mantle, wings, and tail wedgwood-blue becoming somewhat greenish on the scapulars; some of the upper wing-coverts tipped with whitish, as are also the secondaries; inner-webs of primary- and secondary-quills brown edged with white; back, rump, and upper tail-coverts bright chestnut; outer tail-feathers edged with white on the inner-webs, the outermost pair fringed with white on both webs; throat and entire under-surface white, including the under wing-coverts, with very slight dark edgings to the feathers on the breast and sides of the neck; axillaries and a patch on the sides of the body blackish; under-surface of the quills whitish at the base and pale brown at the tips; lower aspect of tail pale brown with dark shaft lines and whitish margins to the feathers. Figured. Collected at Derby, North-west Australia, on the 21st of May, 1886.

Adult female. Similar but duller in colour.

Immature. Resemble the adult female in general appearance. The streaks on the head not so defined, each feather having a whitish tip. Feathers on the back and scapulars edged with rufous.

Nest. A tunnel sometimes in a bank, at others in a white ants' nest or other handy place.

Eggs. Clutch, four or five. White and roundish. 26 mm. by 21-22.

Breeding-season. September or October to December or January.

RED-BACKED KINGFISHER

THIS species is remarkable in the presence of red on the back and has no near relation as far as can be judged from present-day species. Its range is peculiar, being as a rule absent from coastal districts but also from the interior proper, though extending almost all round Australia.

It was first described by Gould who wrote: "This Kingfisher is an inhabitant of the interior, but over what extent of country it may range is not yet known. The only parts where I myself observed it were the myall-brushes (*Acacia pendula*) of the Lower Namoi, particularly those growing on the edge of the large plain skirting the Nundawar range. It was usually seen sitting very upright on the dead branches of the myall- and gum-trees, sometimes on those growing out on the hot plains, at others, on those close by the riverside. I succeeded in obtaining both old and young birds, which, judging from the plumage of the latter, I should suppose had left their breeding-place about a month before I arrived in the neighbourhood of the Namoi, in December. I also saw in this district the common or Sacred Kingfisher, but in far less abundance than between the ranges and the coast. This latter species may be hereafter found to be an inhabitant of the country bordering the sea, while the Red-backed Kingfisher may be exclusively a denizen of the interior. The unusual colouring of the back at once distinguishes it from all the other members of the genus inhabiting Australia, but in its general economy and mode of living it presents no observable difference. Gilbert procured examples of this species during Dr. Leichardt's overland expedition; Captain Sturt found it at the depôt in South Australia; and I have received specimens from the interior of Swan River; consequently it has a very wide range. . . Mr. Elsey informed me that he saw the Red-backed Kingfisher on the Macarthur River, about one hundred miles from the coast, in lat. 26° 15' S."

Since Gould's time there has not been a lot recorded about the habits of the bird, which consequently appear to be not unlike those of the next genus, but a detailed study of its life-history would be very useful.

Mr. Thos. P. Austin has given me the following observations: "The first time I noticed the present species in this district (Cobbora, New South Wales) was in the spring of 1907, and since then I have seen a few pairs every year: they arrive in the spring, and always breed here, drilling a hole into the bank of a river or dry creek, seldom near water. They build no nest, simply laying four or five eggs on the dry, powdered earth on the bottom of the egg-chamber at the end of their nesting-burrow, which is usually about fifteen inches in length, but sometimes much more. They must have wonderfully strong beaks, because they are able to drill holes into the very hardest clay, which is often mixed up with gravel;

THE BIRDS OF AUSTRALIA.

in fact, they seem to prefer this dry, hard clay, and often drill their nesting-burrows half way down a steep bank, where the clay has almost formed into sandstone. They are rather late breeders, as of twenty nests I have examined containing eggs, two were in October, nine in November, five in December, and four in January. It is not a very unusual thing, when hunting for these nests, to find the sitting bird dead upon the eggs. Some will not flush from the nest; I have several times enlarged the entrance hole sufficiently to get my hand in, and taken the eggs from beneath the sitting bird: they do not show any signs of fright, but sometimes jam themselves tightly up at the extreme end of the chamber. They have a single mournful note, uttered at short intervals, but kept up for a long time, usually while perched upon a stump, or a dead tree."

Mr. Sandland wrote me from Balah, South Australia: "Several pairs come about every year. They appear in August and leave in January. I have taken nests in an old lime-kiln, in a bank where drain had cut into a tank, and also from trees. When taken in trees it was always where a large limb had broken off, and the birds had tunnelled into the decayed wood in the standing trunk. I have always found five eggs in a full clutch."

Mr. Tom Carter has sent me the following notes: "In your 'Reference List' this species is given as occurring only in Northern Territory and North-west Australia. It is, however, not uncommon at Kellerberin, about 100 miles east of Perth, and therefore occurs in Mid-west Australia. On January 9, 1903 in company with Mr Bruce W. Leake, we dug into the nesting cavity of a Red-backed Kingfisher, and found five eggs, much incubated. The hole had been excavated in the side of a trench dug for conveying the Coolgardie water-pipes. Several other birds of this species were noted on that visit. The country was mostly covered with Salmon and Gimlet Gum timber. Red-backed Kingfishers were common in the Gascoyne district and inland from Point Cloates. In October 1887 a nest containing five eggs was opened out in the side of a white-ant hill in thick mallee scrub along the telegraph line near the south end of Shark's Bay (Flint Cliff). October 2, 1913. I examined a nesting cavity in the bank of the Gascoyne River near Carnarvon. It contained five incubated eggs, placed about two feet in from the aperture. Nesting material was very slight, of fine dry grass and weeds, but very probably these had been originally placed there by Black and White Swallows (*Cheramæca*) as several of their nesting cavities were close round. The breeding-season about the Gascoyne is mostly in September. The birds have a mournful whistling note. From examination of gizzards they feed largely on *Scorpions*,

RED-BACKED KINGFISHER.

also centipedes, beetles, etc. This species was also noted nesting in cavities in the sides of shell-shafts, before being timbered."

Whitlock recorded (*Emu*, Vol. VIII., p. 189, 1909): "Not uncommon throughout the district (Pilbarra Goldfield). I obtained eggs on the upper Coongan. On the de Grey the blacks had dug out a young brood, which they were taking home to be cooked and eaten. The tunnel to the nests I dug out was not more than a foot long, but the nesting-chamber was very roomy. The tunnel sloped upwards, unlike those of the Bee-eater and Red-lored Pardalote."

Berney noted (*Emu*, Vol. VI., p. 44, 1906): "Red-backed Kingfisher. I do not know whether I have been overlooking this Kingfisher, but up to January last year I did not recognise it: from thence to March this year it was plentiful enough. It could be seen and heard constantly, not only in the timbered country, but out on the downs, where it seemed very partial to the vicinity of homesteads. This winter it has quite disappeared. The species is of considerable value as a grasshopper-destroyer."

Macgillivray added (*Emu*, Vol. XIII., p. 160, 1914): "Found both at Cloncurry and at Sedan. At the latter place the following note was made, 21st February, 1910: 'Found Red-backed Kingfisher's nest with three eggs, and another containing five young birds. The latter looked like little porcupines, all the feathers being encased in sheaths. Body feathers about half inch long, primaries 2 inches, rectrices $1\frac{1}{2}$ inches. I got one of them out and was going to kill it for a skin, but it commenced to bite my thumb and try to swallow it, and it looked so fearless that I had to put it back in the nest.' They were common also on the Leichardt River."

Rogers' notes recorded by Hall (*Emu*, Vol. II., p. 49, 1902), read: "I found the beginning of a nest (1/11/00 on the Fitzroy River, North-west Australia) with the tunnel in an ant heap 4 inches. On the 4th the tunnel extended 12 inches inward. On the 7th I dug it out, and found four eggs. The bird stayed in the whole time, and scarcely moved a muscle when taken from the eggs. I put her quietly down. This was owing to the great heat (120° F. in the shade). The chamber was $6 \times 6 \times 7$ inches."

Rogers later on wrote to me from Wyndham, North-west Australia: "December 17, 1908. Nest found to-day contained one fully fledged young, while two others and female parent were in a tree near by. The nest tunnel was drilled twelve inches into a white ants' nest which filled the hollow stump of a large tree. Nest-chamber 5×3 wide and 3 inches high, roughly constructed. There were a great many lizard bones in the

THE BIRDS OF AUSTRALIA.

mouth of the tunnel and on the ground outside. Height from ground, three feet. Smelt strongly."

This dull-coloured species shows little variation save in depth of the dullness, and, as this varies seasonally and long series had never been brought together, no value was given to the differences observed until I compiled my "Reference List" in 1912, I there admitted two subspecies:

Halcyon pyrrhopygius pyrrhopygius Gould. New South Wales,
South Australia.

Halcyon pyrrhopygius obscurus.

"Differs from *H. p. pyrrhopygius* in its slightly smaller size, and its duller coloration above, but having the rump more brightly coloured.

Parry's Creek, North-west Australia.

Northern Territory, North-west Australia."

I later added,

Halcyon pyrrhopygius utingi.

"Differs from *H. p. obscurus* in having the wings more sky-blue, the head less green, and the black nuchal stripe more pronounced.

Cape York, North Queensland."

These three subspecies were still recognised in my "List of the Birds of Australia," but re-examination of my collection, since increased, indicates that the characters given above for separation are more or less of an individual nature, and I have been unable to determine fixed features as my series is still too small to show the seasonal and sexual variation accurately. I might here explain, for the benefit of northern critics, that the climatic conditions in Australia are vastly different from those of northern climes, and it is impossible to compare specimens of similar date with the assurance of a northern student. Hence the series I possess, though possibly quite sufficient to fix a subspecies, as regards a Palæarctic bird, does not adequately express the geographical variation in this case, and, consequently, I do not admit any recognisable subspecies of this form at this time.

GENUS—SAUROPATIS.

SAUROPATIS Cabanis and Heine, *Mus. Hein.*, Vol. II.,
p. 158, 1860 Type *S. sancta*.

SMALL Dacelonine birds with long bills, long wings with short secondaries, long tails, and small feet, and peculiar coloration.

I have considered this genus in connection with the genus *Lazulena* and noted that it was recognised on account of the diastataxic condition of the wing. By morphologists the diastataxic form is considered as the older, the eutaxic as now seen being a reversion to the probably eutaxic original state. If this be admitted, then this group would be older than the eutaxic *Halcyons*, and this appears to be the case, judging from coloration, structure and geographical distribution. Thus, *Sauropatis* ranges from Abyssinia to the Central Pacific, with scarcely any recognisable differences in colour or structure. Yet coincident in the latter locality is found the *Todiramphus* series, which is separable only by the flattening of the bill and the rounding of the wing, the colour remaining constant. The exact value of the former is problematical, though admittedly very old. I make this note, as the type of *Sauropatis* ranges into the islands of the South Pacific, and we have subspecies which show similar evolution, though, of course, not to the same extent, else they would be classed in *Todiramphus*.

SAUROPATIS SANCTA.

SACRED KINGFISHER.

(PLATE 339.)

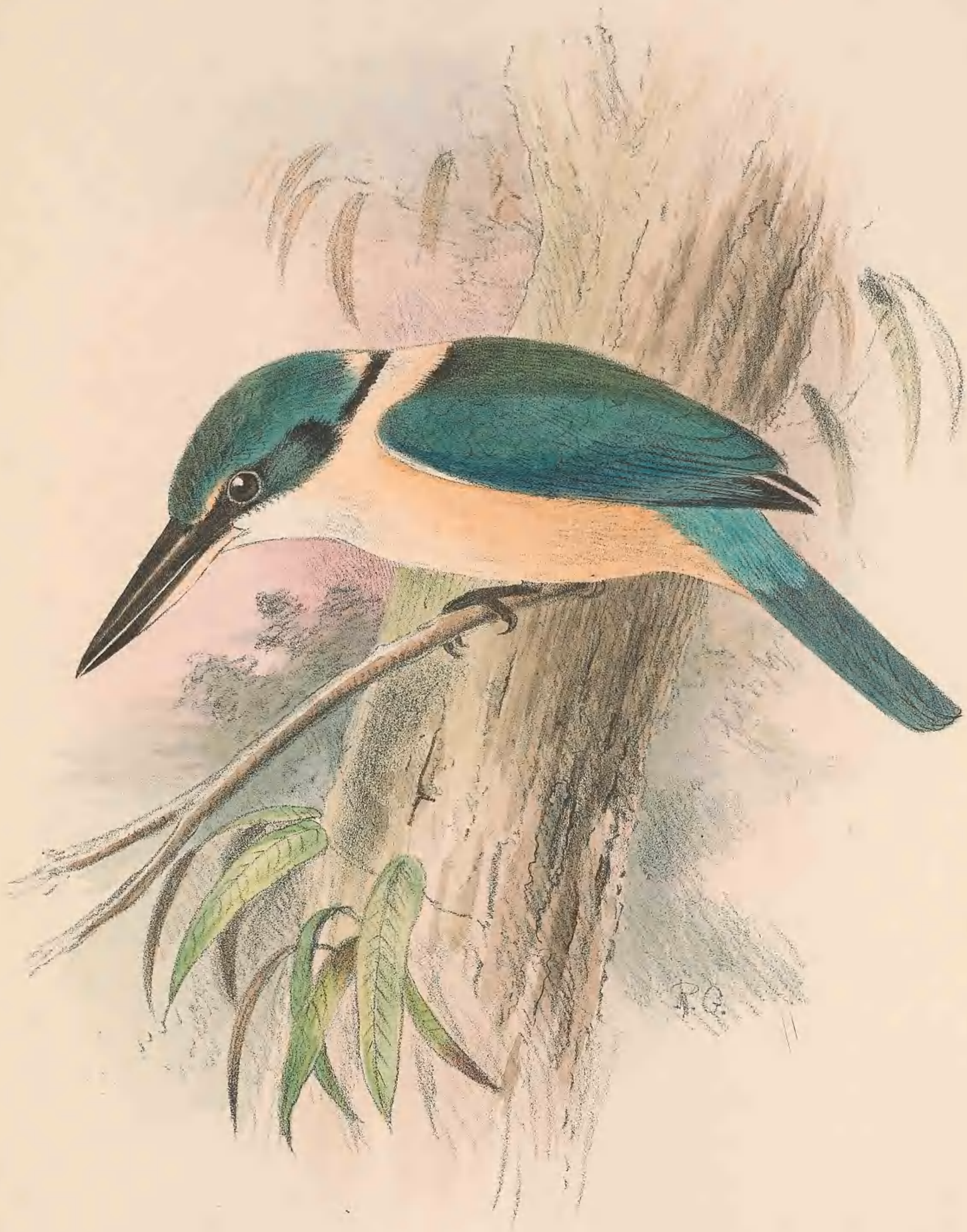
HALCYON SANCTUS Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 206, 1827 :
New South Wales.

Sacred Kingfisher Philipps, Voy. Botany Bay, p. 156, and pl. opp., 1789; White, Journal
Voy. N.S.W., p. 193, and pl. opp., 1790.

Halcyon sacer (nec Gmelin) Stephens, in Shaw's Gen. Zool., Vol. XIII., p. 98, 1826;
Jardine and Selby, Illus. Ornith., Vol. II., pls. 96, 97, 1830.

Halcyon collaris (nec Swainson) Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV.,
p. 206, 1827; Gould, Synops. Birds Austr., pt. III., pl. 53, 1838.

Halcyon sanctus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 206, 1827;
Gould, Birds Austr., pt. I. (Vol. II., pl. 21), 1840; Diggles, Ornith. Austr., pt. II.,
1866 (text only); Sharpe, Monogr. Alced., p. 239, pl. 91, 1870; Castelnau and
Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 380, 1877 (Q.); Ramsay, *ib.*, Vol. II.,
p. 179, 1878; Sharpe, Zool. Coll. Alert, p. 24, 1884 (N.Q.); Ramsay, Proc. Linn.
Soc. N.S.W., 2nd Ser., Vol. I., p. 1086, 1886 (N.W.A.); *id.*, Cat. Austr. Alced., p. 7,
1894; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 267, 1892; Hall, Key Birds
Austr., p. 57, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 558, 1901;
A. G. Campbell, Emu., Vol. II., p. 16, 1902 (Vic.); H. E. Hill, *ib.*, pp. 35/162 (Vic.);
Hall, *ib.*, Vol. II., p. 50, 1902 (N.W.A.); Le Souëf, *ib.*, p. 152, 1903 (N.T.);
Lawson, *ib.*, Vol. IV., p. 136, 1905 (W.A.); Batey, *ib.*, Vol. VII., p. 11, 1907 (Vic.);
G. F. Hill, *ib.*, p. 21 (Vic.); Austin, *ib.*, p. 74 (N.S.W.); Butler, *ib.*, p. 89 (Tas.);
Mathews, Handl. Birds Austral., p. 54, 1908; Ingram, Ibis, 1908, p. 466 (N.Q.);
Whitlock, Emu, Vol. VIII., p. 189, 1909 (W.A.); Mathews, *ib.*, Vol. IX., pp. 7/58,
1909 (N.W.A.); *id.*, *ib.*, p. 68 (N.T.); Gibson, *ib.*, p. 76 (S.W.A.); North, Austr.
Mus. Spec. Cat. No. 1, Vol. II., p. 372, 1909; Littler, Handb. Birds Tasm., p. 80,
1910; Crossmann, Emu, Vol. IX., p. 150, 1910 (N.W.A.); Campbell and White, *ib.*,
Vol. X., p. 197, 1910 (Q.); Broadbent, *ib.*, p. 234 (N.Q.); G. F. Hill, *ib.*, p. 271,
1911 (N.W.A.); Stone, *ib.*, Vol. XII., p. 117, 1912 (Vic.); Macgillivray, *ib.*, Vol. XIII.,
p. 160, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.); Cheney, *ib.*,
p. 207, 1915 (Vic.); H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.); Campbell
and Barnard, *ib.*, Vol. XVII., p. 17, 1917 (N.Q.).



Roland Green, del.

Witherby & Co.

$\frac{2}{3}$
SAUROPATIS SANCTA.
SACRED KINGFISHER).

SACRED KINGFISHER.

Halcyon cinnamominus (nec Swainson) Lesson, Voy. Coquille Zool., Vol. I., p. 343, 1826 : pt. II., p. 696, 1830.

Dacelo chlorocephala, var. β Lesson, Traité d'Ornith., p. 246, 1830.

Alcyon sanctus Lesson, *ib.*

Alcyone ruficollaris Bankier, Ann. Mag. Nat. Hist., Vol. VI., p. 394, 1841 : Port Essington (N.T.)

Todiramphus sancta Bonaparte, Consp. Gen. Av., Vol. I., p. 156, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 128, 1865 ; Ramsay, Ibis, 1866, p. 327 (Q.) ; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 582 (Q.) ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 (N.Q.).

Todiramphus " *australasiæ* " Bonaparte, Consp. Gen. Av., Vol. I., p. 156, 1850.

Sauropatis sancta Cabanis and Heine, Mus. Hein., Vol. II., p. 158, 1860.

Dacelo sancta Schlegel, Mus. de Pays Bas, Alced., Vol. III., p. 35, 1863.

Halcyon westralasianus Campbell, Emu, Vol. I., p. 25, 1901 ; Vasse, West Australia ; Mathews, Handl. Birds Austral., p. 54, 1908 ; Le Souëf, Emu, Vol. VIII., p. 63, 1908 ; G. F. Hill, *ib.*, Vol. X., p. 271, 1911 (N.W.A.).

Halcyon sanctus sanctus Mathews, Nov. Zool., Vol. XVIII., p. 288, 1912.

Halcyon sanctus westralasianus Mathews, *ib.*, p. 289.

Halcyon sanctus ramsayi Mathews, *ib.* : Parry's Creek, North-west Australia.

Halcyon sanctus confusus Mathews, *ib.* : Cooktown, North Queensland.

Sauropatis sancta sancta Mathews, List Birds Austr., p. 149, 1913.

Sauropatis sancta westralasiana Mathews, *ib.*

Sauropatis sancta ramsayi Mathews, *ib.*

Sauropatis sancta confusa Mathews, *ib.*

Sauropatis sancta ruficollaris Mathews, Austral Avian Recrd, Vol. II., p. 129, 1915.

DISTRIBUTION. Australia ; Tasmania ; Extra-limital.

Adult female. Upper back and scapulars dull green ; lower back, wings, and tail bluish-green ; inner-webs of primary- and secondary-quills dark brown with pale edges ; tail-feathers slightly edged with pale brown on the inner-webs ; upper tail-coverts brighter and inclining to cobalt-blue ; head also bluish-green, brighter above and behind the eye ; lores blackish continued in a line below the eye on to the hinder face and extended in a narrow line round the hind-neck ; a supraloral streak of buff which is extended to above the eye ; chin and throat white ; a collar round the hind-neck, breast, abdomen, and under tail-coverts pale sandy-buff, rather deeper in colour on the sides of the body, axillaries, and under wing-coverts ; under-surface of quills and lower aspect of tail pale brown. Eyes blackish-brown ; feet and tarsus brown ; bill black, lower base whitish. Total length 214 mm. ; culmen 40, wing 90, tail 60, tarsus 14. Figured. Collected at Parry's Creek, North-west Australia, on the 10th of October, 1908.

Adult male. Similar to the adult female, but with a buffy tinge on the under-surface, and the collar on the back of the neck.

Immature. Resemble the adult in general appearance, but much duller. Some examples have the under-surface and collar on the back of the neck cinnamon or buff. Like the bird described Ann. Mag. Nat. Hist., Vol. VI., No. 38, p. 394, 1841.

Nest. A hole in a tree or white ants' nest.

THE BIRDS OF AUSTRALIA.

Eggs. Clutch, four to six. White and roundish. 25 to 28 mm. by 21·5 to 22·5.

Breeding-season. October to January.

THIS common bird was observed by the very earliest voyagers, but was confused with another species, belonging to the same group, from the Pacific Islands. By the earlier systematists it was ranked as a variety of the Sacred Kingfisher, and was figured under that name in Phillips' *Voy. Botany Bay*, and also White's Journal, *Voy. New South Wales*. It was not differentiated until 1827, when Vigors and Horsfield published their *Descriptions of Australian Birds in the Collection of the Linnean Society*, when they introduced it as a new species under the name *Halcyon sanctus*. It is interesting to note their reasons: "If the several birds, which have been described as varieties of the *Alcedo sacra* of Gmelin, be actually found to belong to that species, our bird may probably be added to the list. We have, however, much doubt of their being mere varieties. In the species of Kingfishers which have been well ascertained we find little variation of plumage; and we seldom observe such an extensive geographical distribution among them as is assigned to the *Alcedo sacra*. The various groups of this family, moreover, approach so nearly to each other in their characters, particularly in the distribution of their colours, that we need not be surprised at finding that most of the *Kingfishers* of the islands of the Indian Ocean bear a general resemblance to each other, so as to appear at first sight varieties of one species. We have not materials sufficient in Europe to enable us to come to any decision on this subject; that must be determined on the spot. But with respect to our New Holland bird, we consider ourselves justified in keeping it distinct from the *Sacred Kingfisher*, until at least some strong grounds are advanced to prove it the same. It differs both from Dr. Latham's and Gmelin's original descriptions of *Alcedo sacra*, which were taken from a bird belonging to the Friendly Islands, by having a conspicuous collar round the neck; by the under parts being yellowish-white, varied with ferruginous and undulated with slight fuscous *fasciæ*, instead of being pure white; and by having a black streak running longitudinally before and behind the eye, with a black collar margining the hind part of the head, and a conspicuous white spot adjoining this collar on the *occiput*. The *Alcedo sacra*, moreover, is described as being more than nine inches in length, Gmelin making it nine and a half, while our bird scarcely exceeds seven inches. Of all the alleged varieties of the *Sacred Kingfisher*, the bird before us comes nearest to the description of those which are said to be found in New Zealand."

SACRED KINGFISHER.

Notwithstanding the above, it would appear that Vigors and Horsfield did not understand the variation of this species, as they also included *Halcyon collaris* as of Latham, synonymising with this the Sacred Kingfisher figured in Phillips' *Voyage to Botany Bay*, and writing: " 'This bird,' says Mr. Caley, 'begins to get noisy in the spring, and may be seen frequently. A pair of them had a nest annually, to the best of my recollection, in a large dried tree in my garden. After the breeding-season they departed: but whether to the woods or to a greater distance, I never discovered. From the circumstance of their appearing regularly in my garden and frequenting the above mentioned dried tree, I considered them migratory.' "

Of course, these notes refer to the species they afterwards described as new under the name *Halcyon sanctus*.

Gould's account is good and full, and is here reproduced as it was written before civilisation had acted upon the natural habits of the bird. He wrote: "The Sacred Kingfisher is very generally dispersed over the Australian continent. I have specimens from nearly every locality; those from Port Essington on the north are precisely identical with those of the south coast; on the other hand, those inhabiting Western Australia are a trifle larger in all their measurements, but otherwise present no differences of sufficient importance to warrant their being considered as distinct. It does not inhabit Tasmania. It is a summer resident in New South Wales and throughout the southern portion of the continent, retiring northwards after the breeding-season. It begins to disappear in December, and by the end of January few are to be seen; solitary individuals may, however, be met with even in the depth of winter. They return again in spring, commencing in August, and by the middle of September are plentifully dispersed over all parts of the country, inhabiting alike the most thickly wooded brushes, the mangrove-forests which border, in many parts, the armlets of the sea, and the more open and thinly timbered plains of the interior, often in the most dry and arid situations far distant from water, and it would appear that, as is the case with many of the insectivorous birds of Australia, a supply of that element is not essential to its existence, since, from the localities it is often found breeding in, it must necessarily pass long periods without being able to obtain it. The gaiety of its plumage renders it a conspicuous object in the bush; its loud piercing call, also, often betrays its presence, particularly during the season of incubation, when the bird becomes more and more clamorous as the tree in which its eggs are deposited is approached by the intruder. The note most frequently uttered is a loud *pee-pee*, continued at times to a great length, resembling a cry of

THE BIRDS OF AUSTRALIA.

distress. It sits very upright, generally perching on a small dead branch for hours together, merely flying down to capture its prey, and in most instances returning again to the site it has just left. Its food is of a very mixed character, and varies with the nature of the localities it inhabits. It greedily devours mantes, grasshoppers, caterpillars, lizards, and very small snakes, all of which are swallowed whole, the latter being killed by beating their heads against a stone or other hard substance, after the manner of the Common Kingfisher. Specimens killed in the neighbourhood of salt-marshes had their stomachs literally crammed with crabs and other crustaceous animals; while intent on the capture of which it may be observed sitting silently on the low mangrove-bushes skirting the pools which every receding tide leaves either dry or with a surface of wet mud, upon which crabs are to be found in abundance. I have never seen it plunge like the true Kingfishers, and I believe it never resorts to that mode of obtaining its prey. On the banks of the Hunter its most favourite food is the larvæ of a species of ant, which it procures by excavating holes in the nests of this insect, which are constructed around the boles and dead branches of the *Eucalypti*, and which resemble excrescences of the tree itself."

Mr. H. E. Hill is quoted in the *Emu*, Vol. II., p. 35, 1902, as giving the following item in some "Notes on the Birds of the Bendigo District, Victoria": "In a bank of a gully I found a tunnel, which I thought belonged to a Pardalote, and while I was digging it out a Sacred Kingfisher suddenly appeared, in a state of great agitation. On digging further I caught sight of the eggs, with the other bird crouched behind them, apparently in great fear. As she (it was probably the female) would not leave the nest, I had to put my hand in and lift her out, when she came without a struggle, and lay quite still in my hand for a moment before endeavouring to escape. The nest contained five fresh eggs on the bare earth." Later he contributed an article to the *Emu*, and the same volume, p. 162, observed: "Not very common anywhere, but to be seen occasionally in any part."

Campbell and White wrote up the "Birds on the Capricorn Group" (*Emu*, Vol. X., p. 197, 1910) and recorded: "Some Kingfishers were noticed about the islands, similar to the ordinary Sacred species, but more brownish about the breast and flanks. Notwithstanding three struck the steamer's lights one night as she was riding at anchor off the island (proving a migratory disposition), some of these birds remain to breed on the Capricorns, because a nest containing eggs was observed on North-West Island. The nesting-place was a hollow limb of a *Pisonia* tree."

SACRED KINGFISHER.

Campbell and Barnard (*Emu*, Vol. XVII., p. 17, 1917) discussing birds of the Rockingham Bay district observed: "Fairly common about Cardwell; often seen about the mangroves and fishing about the beach. We have no doubt that they were the common migratory *sanctus*. We did not observe any breeding."

Captain S. A. White writes: "This was once a very common bird at the Reedbeds, and once in numbers along the River Torrens. Where it used to breed in the banks of the river it has now almost disappeared, due mostly to the sewer rat driving them out of their nesting burrows; some took to the hollow tree spouts, but I fancy the imported English Starling drove them away from all hollow trees. This Kingfisher is only found on the banks of streams near the coast, and I have never once seen it in the dry interior. The call is a monotonous one, repeated for hours. Food consists of insects, and at times small fish, but I have never seen it dive under water for the latter. Nesting tunnel is made into the bank up to eighteen inches in depth, when the egg-chamber is hollowed out and four round white eggs placed on the bare earth without any lining."

Mr. Thos. P. Austin's notes read: "All the years I lived here up till 1907 (the first time I saw the Red-backed species) this bird was very plentiful, but since that year they have been rather scarce. I am of the opinion that they do not like each other's company. In their nesting habits they somewhat differ from the Red-backed species, as they prefer to nest near water, and when they resort to river banks or creeks, they always choose soft soil; but most of them nest in hollow branches of trees, and they are not very particular as to height. I have seen their nesting hollows from about two feet above water, in a hollow branch, up to about sixty feet from the ground. They use no nesting material, simply laying their eggs on the decaying wood, when nesting in a tree, or the powdered soil when nesting in a bank. Although it may often be seen miles away from any water in thick scrubs, it prefers the open forest country in the vicinity of rivers, large dams, swamps, and lagoons, etc. They will often betray the presence of their nest by loud cries, or by darting down towards an intruder. Their food chiefly consists of crickets, yabbies, grasshoppers, and suchlike insects. It does not remain here throughout the year, being only seen during the summer months, and all the nests I have examined containing eggs have been during the month of November. The clutch is mostly either four or five eggs. When drilling a nesting hole, both birds assist in the work of excavation in exactly the same manner as *Dacelo gigas*."

Mr. J. W. Mellor has written me: "These birds are the most common

THE BIRDS OF AUSTRALIA.

of Kingfishers in the southern parts of Australia, and in South Australia they may be seen along all the rivers. At the Reedbeds we have it all the year round, its food consisting of small fish from the stream, also it may often be seen darting down on the ground in the paddocks, catching some grub or insect, which it will take to a neighbouring tree, and there whack it against the bough until battered about, and eventually swallow it. Although in many places this bird breeds in hollow limbs of trees, at the Reedbeds it always burrows holes in the dry bank of the stream, well above summer level of the water, the burrow being only a foot or eighteen inches deep, and hollowed into a cavity, inside which it lays four or five round white eggs on the soft dry soil, and when the young hatch out, the position of the nest is easily observed by the excrement from the young that runs down the bank at the mouth of the burrow, and also by the harsh, screeching notes of the young, which sound like half-buried notes, as they call to the parent bird to bring them food, for they are ravenous little things. They breed late, starting late in October and going on into November, December and January; no doubt the birds wait until the water level is sure, else a flood would swamp out their nests, and so spoil their work, as their burrows are always well down below the usual winter level of the water. They use the old hollows again for several years, until they get dilapidated, and then they often burrow out a new one not far away. I also saw them on the Capricorn Isles when there in October 1910, and when camped on North-West Island I took a nest of eggs, four in number, from a hollow in a soft wooded *Pisonia* tree: here the birds seemed to live solely on the sea life, eating small crabs and crustaceans and marine life found on the coral reefs when the tide was low, and being no fresh water, it was obvious that they did not require that as a necessity for living."

Mr. F. E. Howe states that to Victoria this bird "is a summer visitor, generally making its appearance towards the end of September, and departs again in early autumn. The call is composed of five high pitched notes, and it also has an angry cry of 'Kree,' which it utters on the wing. Both birds help in feeding the young, and also in drilling the dead wood from the tree boles where the eggs are to be placed."

This supposed migratory movement in Victoria has been also remarked upon by other observers, and Mr. E. J. Christian wrote me: "This is a migratory bird, and departs from the South as soon as winter comes. It seems to like the dry warm places, and, although a Kingfisher, does not catch fish. I have seen it in parts where dams were all dry, and there was no water for miles around. It is a useful bird, and lives on

SACRED KINGFISHER.

lizards, beetles, grasshoppers, etc. It prefers to drill its own nest, and seeks a dry dead tree where it has no difficulty in making a hole. It seems to me to migrate just according to food supply. In 1908 I observed parents taking food to a nest on October 14. Hall in "Insectivorous Birds of Victoria" stated: "Within Victoria it proves migratory as the winter advances: though this does not apply to the warmer districts just north of it." I do not quite agree with this last sentence, for in 1908 I noticed it first on its southward journey on September 15. By observations on different parts of the run I found that it came from the north-west. The breeding-season here seems to be any time between early and late December, though I think most of the birds breed twice. On February 5th, 1909, they departed north again."

Mr. H. S. Dove has written me: "This species is only found in South Tasmania in summer, from about October onwards."

Mr. J. P. Rogers sent me some interesting notes, as follows: "At Parry's Creek, North-west Australia, on Nov. 24, 1908: a pair of these birds have been here for 10 days, and have been flying from tree to tree in the vicinity of my camp, and have been very noisy. To-day, at 10 a.m., they started to dig a nest hole in a white ants' nest in the end of a broken branch of a white gum tree, just outside my window: they had a hard task, as the nest was very solid, and they could not get a foothold. One would fly up to the limb, and give one or two blows with its beak, and then fly back to a twig a few feet away, and then the other bird would try. They kept this up, without more than a few minutes' intermission, until 3.30 p.m. They then had a hole in about one inch, but still had a bad foothold, and could not work well. Nov. 25: Both birds worked very hard to-day: started at sunrise, and were working at 9 a.m., when I returned from my morning round, and continued until 4 p.m., when I left the camp again. They worked steadily, at short intervals, and kept up a continual scolding noise when working. Their foothold is still bad: they hang from the mouth of the hole, and, propping themselves with their tail, strike a few heavy blows, then fall back, and fly to their perch about thirty inches away. Nov. 26: Birds were working hard at 6 a.m., but were gone at 10 a.m., and have not seen them since. Nov. 30: Birds were back again this morning and worked intermittently, but can make no progress. Dec. 7: Birds still work intermittently, but make no progress. Dec. 10: Still working. Dec. 19: Birds have apparently given up, as I have not seen them since Dec. 10. Dec 21: I climbed the tree to-day, and find that the ant's nest is only one inch thick: the limb had been topped, and the end was dead solid timber, with one little hole about one

THE BIRDS OF AUSTRALIA.

inch deep, where a little wood had drawn out and left a small hole, into which the birds had bored their tunnel. Kingfishers are not too intelligent, or else are extra hopeful. . . . At Marngle Creek I saw a few of these birds, but none at Mungi. They are fairly numerous on the coast, and are often seen on the Fitzroy River. Dec. 16, 1911: Cooper's Camp, Melville Island. Rare here, while I did not meet with it on the north side of the Island."

Mr. Tom Carter has written me: "The Sacred Kingfisher was not common in the region of the North-West Cape, nor the Gascoyne, and was not resident. Only two specimens were observed by me during a residence there of seventeen years, and both these were in February. Peculiarly enough, when on a visit there later, I shot one at Yardie Creek on Aug. 28, 1913, which was not breeding. It measured nine inches in length, which seemed large to me. They are abundant through the south-west, and to a certain extent are migratory. About Broome Hill they were practically absent during the winter months, and would make an appearance towards the end of September. Dates of first noted arrivals read: Oct. 2, 1905, Oct. 1, 1907, Sept. 23, 1908, Sept. 17, 1910 and Oct. 7, 1912, so their arrival was fairly regular, and was soon observed from the loud piping notes of the birds. November appears to be the main breeding month of the birds at Broome Hill. January 22, 1906: Fledged young being fed by adults, on tadpoles mostly, caught from a stock tank, to the edge of which the young had been led by the parents. Feb. 22, 1906: Caught a recently fledged young. Nov. 4, 1906: Four fresh eggs in nest. Dec. 22, 1907: Young in nest. Dec. 2, 1908: Young heard in nest. Dec. 13, 1910: Young in nest. Dec. 24, 1910: Fledged young noticed. The adult birds constantly dropped in the water, in the centre of stock tanks, catching tadpoles, and often went below the surface. This species was common around Albany in summer months. The eggs are laid in holes of trees, often at a considerable height from the ground, thirty feet or more, sometimes as low as seven feet only."

Macgillivray in the *Emu*, Vol. XIII., 1914, contributed an article on Queensland birds, and there reported: "Mr. McLennan did not come across this species in the Gulf country, though I had previously obtained skins from Cloncurry. At Cape York, Mr. McLennan first noted them as numerous in the mangroves on 19th March, 1911. Of three specimens obtained, all proved to be young birds. They were also numerous on the Hannibal, Macarthur, and Bird Islands in June and July, 1911, and again in the Mud Bay mangroves in February and March."

A peculiarly invariable species with little constancy, this bird does

SACRED KINGFISHER.

not lend itself to easy subspecific division, yet well-marked species can be recognised when good series of specimens are compared. It may be stated that the general features of the subspecies are obscured by the variation when a few birds are criticised, and further that subspecific characters can rarely be estimated from single specimens. The range of the species is large and the entire variation small; that is, birds from the extreme limits of its range may be confused, and with careless handling subspecies would not be admitted, while, on the other hand, unscientific workers might desire to differentiate species. The immature show markings on the breast, but these persist sometimes in the females, though rarely in the males, and can be utilised in connection with other features in the separation of subspecies. Adult males are more or less uniform on the under-surface and vary in the depth of colouring thereon, some being very buff, others almost pure white. The upper coloration shows little colour change, while in size there is not much latitude: the bill varies a little in length, but here it is necessary to carefully discriminate between old and young, male and female, before utilising this character.

Many years ago Surgeon Bankier described a new species from Port Essington as *Alcyon ruficollaris*: this name was neglected by Gould, was not catalogued by Sharpe, and was only determined by myself through the kind intervention of my friend, Dr. C. W. Richmond. Bankier's specimen was a very deep-coloured adult bird, and his name must be used for the northern race. As this form was not recognised until a couple of years ago we can state that no differentiation had been attempted until Campbell in 1901 named the West Australian form, *Halcyon westralasianus*, writing: "It resembles closely the common *Halcyon sanctus*, but has decidedly a more bluish (bluish-green) coat, while the nuchal band and all the under-surface are white, instead of being buff-coloured as in *H. sanctus*." I had a fair representative series when I studied the species for my "Reference List," published in the *Nov. Zool.*, Vol. XVIII., 1912, and there recognised four subspecies:

Halcyon sanctus sanctus (Vigors and Horsfield). New South Wales, Victoria; South Australia.

Halcyon sanctus westralasianus (Campbell). South-west Australia.

Halcyon sanctus ramsayi.

"Differs from *H. s. sanctus* in its slightly smaller size and wider bill, and its brighter coloration on the secondaries and upper wing-coverts.

Parry's Creek, N.W. Australia

North-west Australia, Northern Territory."

THE BIRDS OF AUSTRALIA.

Halcyon sanctus confusus.

“Differs from *H. s. sanctus* in its smaller size and longer bill, and from *H. s. ramsayi* in its greener coloration on the secondaries and wing-coverts, and especially in its verditer-green upper tail-coverts and greener tail.

Cooktown, N. Queensland
North Queensland.”

When Ramsay examined specimens from Derby, North-west Australia, he noted the differences ascribed by me to the north-western birds, writing twenty-five years before: “Slightly smaller, and of a clearer blue on the back than our N.S.W. specimens with a narrow well-defined white collar and nuchal spot. Wing 3·6 inches, bill from nostril 1·5; total length, 7 inches from the tip of the bill.”

In my “List” I maintained the four subspecies above detailed the range of the first mentioned being extended to South Queensland and Tasmania.

I have again carefully criticised a fine lot of specimens and have been able to confirm absolutely the above and also distinguish a fifth, and it seems quite possible that more skins would show a further subdivision. A notable feature is the prevalence or rarity of fully adult males, and this does not seem due to methods of collecting.

I now recognise five subspecies in Australia as follows:

Sauropatis sancta sancta (Vigors and Horsfield). South Queensland; New South Wales; Victoria; Tasmania; South Australia.

This is the common eastern form with the general upper coloration dull, the under-surface being pale buffy; in the senile male unmarked, in the females and immature the breast showing dark tips to the feathers.

Sauropatis sancta westralasiana (Campbell) South and Mid-west Australia.

This subspecies, on a series only, confirms Campbell’s characters, the senile males showing little or no buffy coloration on the under-surface: the upper coloration is not well differentiated from that of the eastern form. Further, adult females seem to attain commonly the unmarked under-surface.

Sauropatis sancta ramsayi (Mathews). North-west Australia.

This form has certainly a clearer blue back than the preceding, and is also a little smaller, while the under-surface shows more buff coloration.

Sauropatis sancta ruficollaris (Bankier). Northern Territory; Melville Island.

SACRED KINGFISHER.

The clear blue back is not so marked in the northern birds, while they are not smaller, and the under coloration is still deeper buffy red. An extreme specimen was named by Bankier, but I have received similar birds showing that this deep coloration is a characteristic of the birds of district.

Sauropatis sancta confusa (Mathews). North Queensland.

This form agrees in coloration best with the typical series, but is appreciably less in size with a longer bill.

In this place it must be recorded that the species has a wide extra-limital range, being found in New Guinea, as well as the Moluccas, New Caledonia, and New Zealand.

The last mentioned place was credited with a distinct species, its validity, however, being discounted generally by workers, as instance, Sharpe noted: "This is a large and richly coloured island race of *H. sanctus*." There is little difference in size, and the extreme *ruficollaris* is as richly coloured. Better series than are generally available are necessary to accurately define the extra-limital subspecies, but the following items may be here indicated.

The New Guinea birds have been simply recorded as *H. sanctus* without indication of any variation which could be regarded as of subspecific value. Thus Ogilvie-Grant, the latest authority on these birds, catalogues twelve specimens which he appears to have considered nearly all immature, and therefore unworthy of consideration in connection with the recognition of subspecies. It is a peculiar item, not pointed out by that writer, that the collectors should not have procured any series, as Goodfellow and Claude Grant both noted that the bird was plentiful and tame.

The New Zealand bird has been long differentiated as a distinct species, but some workers denied this rank, while it has been accepted more recently as a subspecies.

Iredale and myself published a "Reference List of the Birds of New Zealand" in the *Ibis* for 1913, and there we recognised two subspecies in that Dominion, namely, *Sauropatis sancta vagans* Lesson from the North Island, and *S. s. forsteri* nov. from the South Island, indicating the long narrow bill as a subspecific character in the latter case. We there tentatively placed Tristram's *H. norfolkensis* from Norfolk Island as a synonym of the North Island race, referring here also the birds from Lord Howe Island and the Kermadec Group. I hope to deal more completely with these later, but may here note that probably Tristram's name will be upheld. His species was differentiated on account of the upturning of the bill, which reminds one of the bill of *Todiramphus*

THE BIRDS OF AUSTRALIA.

recurvirostris Lafresnaye. Although this was abnormally developed in the type specimen, I have received specimens and find that there is a general tendency in this direction in the birds from this Island.

Still more recently Brasil, in a most excellent paper on the "Birds of New Caledonia," has separated the New Caledonian bird as a distinct subspecies, *S. s. canacorum*, and this I hope also to deal with later when I anticipate confirmation of Brasil's action.



Roland Green, del.

Witherby & Co

$\frac{4}{5}$

SAUROPATIS SORDIDA.
(MANGROVE-KINGFISHER)

SAUROPATIS SORDIDA.

MANGROVE KINGFISHER.

(PLATE 340.)

HALCYON SORDIDUS Gould, Proc. Zool. Soc. (Lond.), 1842, p. 75: North coast of Australia (Cape York).

Halcyon sordidus Gould, Proc. Zool. Soc. (Lond.), 1842, p. 75; *id.*, Birds Austr., pt. 32 (Vol. II., pl. 23), 1848; Diggles, Ornith. Austr., pt. 21, 1870; Sharpe, Monogr. Alced., p. 233, pl. 88, 1870; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1878; Sharpe, Zool. Rep. Alert, p. 24, 1884 (N.T.); Ramsay, Tab. List Austr. Birds, p. 3, 1888; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 278, 1892; North, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. VII., p. 395, 1892 (Q.); Ramsay, Cat. Austr. Alced., p. 11, 1894; Hall, Key Austr. Birds, p. 57, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 560, 1901; *id.*, Emu, Vol. I., p. 25, 1901 (N.W.A.); Carter, *ib.*, Vol. III., p. 96, 1903 (N.W.A.); Mathews, Handl. Birds Austral., p. 55, 1908; Le Souëf, Emu, Vol. VIII., p. 63, 1908 (N.A.); Broadbent, *ib.*, Vol. X., p. 235, 1910 (N.Q.); Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.); North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 376, 1909; Witmer Stone, Austral Av. Rec., Vol. I., p. 152, 1913; Macgillivray, Emu, Vol. XIII., p. 160, 1914 (N.Q.); H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.); Campbell and Barnard, *ib.*, Vol. XVII., p. 17, 1917 (N.Q.).

Todiramphus sordidus Bonaparte, Consp. Gen. Av., Vol. I., p. 157, 1850; Gould, Handb. Birds Austr., Vol. I., p. 132, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 582 (Q.); Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 (N.Q.); *id.*, *ib.*, Vol. II., p. 270, 1878 (N.T.).

Sauropatis sordida Cabanis and Heine, Mus. Hein., Vol. II., p. 159, 1860.

Halcyon sordidus sordidus Mathews, Nov. Zool., Vol. XVIII., p. 289, 1912.

Halcyon sordidus cooktowni Mathews, *ib.*: Cooktown, North Queensland.

Halcyon sordidus melvillensis Mathews, Austral Av. Rec., Vol. I., p. 38, 1912: Melville Island. Montague, Proc. Zool. Soc. (Lond.), 1914, p. 633: Monte Bello Islands, W.A.

Sauropatis sordida sordida Mathews, List Birds Austr., p. 149, 1913.

Sauropatis sordida melvillensis Mathews, *ib.*, p. 150.

Sauropatis sordida colcloughi Mathews, Bull. Brit. Orn. Club, Vol. XXXVI., p. 61, Feb. 22, 1916: Mud Island, near Brisbane, Queensland.

DISTRIBUTION. Northern Australia, as far south as Brisbane on the east coast, and Point Cloates on the west coast.

THE BIRDS OF AUSTRALIA.

Adult male. Head, nape, upper back, scapulars, and upper wing-coverts dusky green becoming bluish-green on the outer aspect of the primary- and secondary-quills, lower back, rump, upper tail-coverts and tail; inner-webs of flight-quills blackish; inner-webs of tail-feathers edged with dark brown; lores and cheeks blackish, as is also a very narrow line round the hind-neck; a short white line on each side of the fore-head; a white collar on the hind-neck which joins the white of the entire under-surface including the under tail-coverts, axillaries, and under wing-coverts; lower-surface of quills blackish, tail below similar but rather paler. Eyes brown, feet blackish-brown; bill black, lower base whitish. Total length 255 mm.; culmen 48, wing 104, tail 67, tarsus 17. Figured. Collected on Melville Island, Northern Territory, on the 23rd of November, 1911.

Adult female. Similar to the adult male.

This species seems to go through the same plumage changes and variations as *sancta*.

Nest. A hole in white ants' nest (Boyd).

Eggs. Clutch, three (Boyd). White, 31 to 32 mm. by 26 to 27.

Breeding-season. October to December.

THE original examples of this species were collected by Mr. Bynoe, R.N., on the north coast of Australia, the exact locality being unknown to Gould who described the species. He later wrote: "Is rather plentifully dispersed over the north-eastern portion of Queensland, or from Moreton Bay to Cape York." I designated Cape York in 1913. Little has been recorded of the habits of this bird.

Mr. Tom Carter has written me: "This species is not given as occurring in Western Australia in your 'Reference List.' It occurred regularly along the coast from Point Cloates to the North-West Cape (80 miles) and was most frequently observed in the months of February, March and April, sometimes in considerable numbers as if on migration. Birds were shot on the following dates for identification purposes, as they may be mistaken when on the wing for *Halcyon sanctus*. Sept. 1, 1901: Shot a pair at high sandstone cliffs on beach near Point Cloates. By dissection the birds were not breeding. Jan. 5, 1899: Many were seen. On Jan. 28, 1899 one was seen on wreck of S.S. Perth about 2½ miles out on reef from Point Cloates beach. Feb. 21, 1898: One shot; also Dec. 27, 1899 and June 15, 1900."

Mr. J. P. Rogers wrote me from Melville Island: "Cooper's Camp, Nov. 1, 1911: These birds have a nest in a large eucalyptus tree about 50 yards from the beach. The nest is in a hollow limb about 60 feet from the ground. I cannot climb this tree. This species is fairly numerous, and so far I have not seen it far from the mangroves: it seems to prefer the scattered mangroves growing along the foreshore to the dense growths of the tidal creeks. They are rather noisy birds, and can be heard for a considerable distance. They are usually seen in small scattered parties up to five or six in number, but are occasionally seen singly."

MANGROVE KINGFISHER.

Campbell and Barnard wrote (*Emu*, Vol. XVII., p. 17, 1915): "Odd birds only of this fine Kingfisher were seen about mangrove creeks (Rockingham Bay district, N.Q.). One would have to endure plagues of mosquitoes and to wade knee deep in mud to observe these birds properly, perchance to find a nest in some hollow mangrove."

Macgillivray (*Emu*, Vol. XIII., p. 160, 1914) wrote: "This fine species, the largest of the smaller Kingfishers, is migratory. Appearing first at Cape York in September, it soon becomes quite numerous in the mangroves, where it is always to be found, and never in open forest or scrub. It feeds upon the smaller crustaceans, such as crabs, crayfish, or shrimps. Its note is similar to that of *H. sanctus*, but much louder. The length in the flesh of an adult male is 10 inches, of a female $9\frac{3}{4}$ inches; irides brown, bill black, legs dark lead colour. No nests were found."

I have some remarks upon this migration from Cape York in connection with the succeeding species. It will be an interesting problem to discover the route and the length of the flight these suggested migratory species take. At the present time we have no evidence as to their "winter" habitat, and consequently only vain conjecture could be indulged in.

The dull coloration of this species has not allowed much subdivision, and it seems doubtful whether it is really specifically separable from *chloris* Boddaert, but as both are recognised from the Aru Islands, and as there are several conflicting elements, such as *Halcyon ænigma* Hartert, I recognise the Australian *sordidus* as a distinct species. I do not, however, include in the species the form Hartert called *H. s. colonus* from the Louisiade Archipelago. That species is very distinct, even as Hartert indicated, though he described it with subspecific rank only.

I have separated three subspecies, indicating Cape York as the typical locality.

Halcyon sordidus cooktowni.

"Differs from *H. s. sordidus* in its longer bill (from nostril to tip 50 mm., typical birds 45 mm.), and in having the head darker olive.
Cooktown, Queensland."

Halcyon sordidus melvillensis.

"Differs from *H. s. sordidus* in its much paler upper-surface and much smaller bill.

Melville Island."

Sauropatis sordida colcloughi.

"Differs from *S. s. sordida* (Gould) in being more brilliantly coloured. The blue in all the feathers of the head, back, and tail being most

THE BIRDS OF AUSTRALIA.

noticeable. The head is bluish-green, not greenish-brown; the back is also bluish-green, and the primaries edged with indigo. Tail blue.

Mud Island, near Brisbane, Queensland."

The range is most peculiar and complex, as this recent recognition of a form as far south as Brisbane on the east coast was balanced by the discovery of another at the Monte Bello Islands on the west coast; while Carter records it from the North-West Cape. It was known from the Aru Islands, and recently Ogilvie-Grant recorded it from south-west New Guinea, writing: "As might be expected, New Guinea examples of *H. sordidus* belong to the larger race of this species, which ranges from the Aru Islands to the Monte Bello Islands, Melville Island, North Australia and Queensland. It was previously unknown from New Guinea. In the birds from the Mimika River, the wing measurements are respectively:—(a) ♂ 110; (b) ♂ 107; (c) ♀ 104 mm. Dr. Hartert records a specimen from Dobbo, Aru Islands, with a wing measurement of 116 mm.; while in the British Museum Collection the largest examples are from the Hope Islands, off Cape Tribulation, East Queensland, a male and female collected there by Macgillivray measuring respectively 122 and 115 mm. In some specimens, however, the wing measurement is much smaller, and two from the Aru Islands measure 103 mm. The average measurement of sixteen specimens is 106 mm. The small race, which has been named *H. s. colonus* Hartert inhabits the Louisiade Archipelago. In seven specimens the wing measurement varies from 86 to 93 mm., the average being 91.5 mm."

The small size and very different coloration entitle Hartert's *colonus* to specific rank, while the variation between the specimens from Australia, save *colcloughi* as noted, is slight as regards colour and size. For the present, I am not recognising any Australian subspecies, except *colcloughi*, but the blue coloration of this form is very remarkable and makes the bird look like a distinct species. When better series are obtained it may be necessary to reinstate the subspecies here rejected, as has been the case in the congener *S. sancta*. I was in the same predicament with good series of the latter, but extended series indicated the subspecific features. In an old genus like the present one small differences constitute subspecific forms, but long series are necessary to recognise these, as the birds show their plumage changes slowly.

I therefore admit:

Sauropatis sordida sordida (Gould). Northern Australia, from Cooktown on the east to the North-West Cape on the west.

Sauropatis sordida colcloughi (Mathews). South Queensland.

GENUS—URALCYON.

URALCYON Heine, Journ. für Ornith., 1859, p. 406 .. Type *U. sylvia*.

SMALL Dacelonine birds with short bills, long wings, short wedge-shaped tails of ten feathers, the two middle ones extraordinarily elongated, and small legs and feet.

The bill is short and unicolor (red), the upper mandible with an upward tendency, similar to that seen in *Sauropatis*, the nostrils rather large and open.

The wing is rounded, the first primary short, equal to the seventh primary and longer than the secondaries: the third and fourth primary are subequal and longest, the second and fifth subequal and little shorter.

The tail of ten feathers has eight short narrow-pointed feathers, forming a distinct wedge, the two middle feathers being very much elongated, tapering very narrow and twisted so that their extremities cross. The longest centre feathers are about three times the length of the succeeding pair, which are much exceeded in length by the wing.

The feet are small, the tarsus obsoletely scutellated.

These Kingfishers, with ten tail-feathers, the centre two much elongate, form a series much more difficult to deal with from the point of view of the student of evolution. Anatomical study is absolutely necessary to determine whether these evolved from the same ancestor or have been independently developed from different sources. They do not appear to have been evolution products of known Kingfisher branches, but rather to have developed alongside the latter from a common ancestral source.

Miller classed the genus "*Tanysiptera*" in his subfamily *Daceloninae*, concluding: "*Tanysiptera* is highly remarkable in the form of its tail, but in no other respect." Beddard, however, had written: "Thus, while they (*Alcedines* as a whole) generally agree with the bulk of their relations in having a characteristically tufted oil gland, the genus *Tanysiptera* (three species at any rate) has a nude oil gland." The italics are Beddard's. I have not seen any discussion of the skeletal features of species of this "genus," and when such are provided it will be very necessary to have the species examined accurately determined.

Structurally the Australian birds differ from the group typified

THE BIRDS OF AUSTRALIA.

by *Alcedo dea* Linné, 1766 not 1758 = *Tanysiptera nais* Gray. The genus name *Tanysiptera* was introduced for this species. Here the bill does not show any upward tendency, but is decurved. The wing is more rounded, the first primary shorter than the secondaries and exceeded by the seventh primary; the intervening five primaries are not much longer, the second equal to the sixth, the third, fourth and fifth subequal and longest. The tail-feathers are quite different, being long and broad: the tail is very much graduated, the outer pair being half the length of the pair next to the central ones: the central pair are three times as long as this next pair, which are equal to the wing in length. The central pair are very narrow with a small spatule at tips, but do not twist and cross.

The species *T. carolinæ* Schlegel is a peculiar form. It has the bill as above, the wing is more rounded, the first primary being less than the ninth and shorter than the secondaries. The tail is similar to that of the preceding, but is shorter than the wing, while the central pair are comparatively short, being less than twice the length of the next pair, and a large racket is present at the tips. I am indicating these differences to show that a new subgeneric name is necessary—

EDQUISTA

for this species alone. The coloration is very peculiar and as far as is known is uniform in the immature and adult. In the preceding forms the immature is very different from the adult in plumage, in some cases the female being also less brightly coloured.

It seems quite possible that later this group will be given family rank, and then the divisions above noted will be accorded full generic value, while possibly many subspecies will be also raised. Thus, when first the different forms were recognised, they were all granted specific rank, as a few specimens only were available and these from diverse localities, the plumages were quite imperfectly understood. At the present time the latter are not surely comprehended. Hartert, in his subspecific schemes, then lumped a large number of the so-called species into one huge species, and this conclusion is now called into question. As we are once more dealing with an old fixed group, the small differences observed may be really specific, but I cannot dogmatise on this point with the present series of skins. However, there seems recently to have been a slight lack of care in the consideration of the Moluccan-New Guinea forms by Rothschild and Hartert as regards the naming of the species, and it is possible this may also have occurred in the criticism of the sub-specific factors. Thus, they accepted the fact that *Alcedo dea* Linné

URALCYON.

1758 was not the same as *Alcedo dea* Linné 1766, and therefore dismissed the latter as a recognisable basis for the species name. Though no definite argument against this conclusion has been produced, in their later papers they reverted to the name they had declared to be incorrect. Such action is perplexing to the student who has not access to the complete literature, and is certain to create confusion and also bring discredit upon other workers.

URALCYON SYLVIA.

WHITE-TAILED KINGFISHER.

(PLATE 341.)

TANYSIPTERA SYLVIA Gould, in Jardine's Contr. Ornith., 1850, p. 105: Cape York, Queensland.

Tanysiptera sylvia Gould, in Jardine's Contr. Ornith., 1850, p. 105; *id.*, Proc. Zool. Soc. (Lond.), 1850, p. 200, 1851; *id.*, Birds Austr., Suppl. pt. 1. (pl. 6), 1851; *id.*, Handb. Birds Austr., Vol. I., p. 137, 1865; Ramsay, Ibis, 1866, p. 325; Diggles, Ornith. Austr., pt. xiv., 1867; Ramsay, Proc. Zool. Soc. (Lond.), 1868, p. 383; Sharpe, Monogr. Alced., p. 259, pl. 100, 1869; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 179, 1888; *id.*, Tab. List Austr. Birds, p. 3, 1888; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 300, 1892; Ramsay, Cat. Austr. Alced., p. 16, 1894; Le Souëf, Ibis, 1898, p. 55 (Q.); Hall, Key Birds Austr., p. 58, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 561, 1901; Mathews, Handl. Birds Austral., p. 55, 1908; Broadbent, Emu, Vol. X., p. 235, 1910 (N.Q.); Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.); North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 377, 1909; Witmer Stone, Austral Av. Rec., Vol. I., p. 152, 1913; Macgillivray, Emu, Vol. XIII., p. 161, 1914 (N.Q.).

Uralcyon sylvia Heine, Journ. für Orn., 1859, p. 406.

Dacelo sylvia Schlegel, Mus. de Pays Bas, Alced., Vol. III., p. 47, 1863.

Tanysiptera sylvia sylvia Mathews, Nov. Zool., Vol. XVIII., p. 290, 1912.

Uralcyon sylvia sylvia Mathews, List Birds Austr., p. 150, 1913.

Uralcyon sylvia dydimus Mathews, Austral Av. Rec., Vol. III., p. 58, 1916: Tully River, Queensland.

DISTRIBUTION. North Queensland. Extra-limital.

Adult male. General colour above ultramarine-blue including the head, neck, wings, scapulars, and outer tail-feathers; mantle black; inner-webs of primary- and secondary-quills brown with buff margins; short innermost scapulars buffy-white; back, rump, upper tail-coverts and middle tail-feathers, which are much elongated, white; lores, sides of face, and ear-coverts black; throat and entire under-surface rufous-chestnut including the axillaries and under-coverts, the bases of the feathers on the sides of the body dusky-brown which shows through and looks more or less like a dark patch; under-surface of quills dark brown with buff edges; lower aspect of tail dark brown, central feathers white. Eyes black; feet and bill scarlet. Total length 340 mm.; culmen 30, wing 96, tail 225,



Roland Green. del.

Witherby & Co

$\frac{2}{3}$
URALCYON SYLVIA.
(WHITE-TAILED KINGFISHER).

· WHITE-TAILED KINGFISHER.

tarsus 14. Figured. Collected at Cape York, North Queensland, on the 27th of January, 1913.

Adult female. General colour above ultramarine-blue including the head, hind-neck, scapulars, wings, and outer tail-feathers; mantle black; inner-webs of primary- and secondary-quills dark brown edged with buff; short inner scapulars pale buff; back, rump, and central tail-coverts silky-white, the lateral ones blue, the long middle tail-feathers also white with blue on the outer-webs, the outer feathers brown on the inner-webs; lores, sides of face, and ear-coverts black; throat and under-surface of body including the axillaries pale rufous-chestnut with dark bases to the feathers; under-surface of quills brown margined with buff on the inner-webs at the base; lower aspect of tail brown with white on the inner-webs of the two central feathers. Eyes black; feet and bill scarlet. Tail 150 mm. Figured. Collected at Cape York, North Queensland, on the 25th of February, 1913.

Immature. Under-surface buff with dark edges to the feathers; throat white; back and scapulars dark brown, with a spot of light buff; head blackish with brown edges to the feathers of the fore-head, which become greenish-blue and ultramarine on the hinder crown; wing-coverts blue with brown edges to the feathers.

Nest. A hole in a white ants' nest in a tree or on the ground.

Eggs. Clutch, three to four. White, 26 to 28 mm. by 23-24.

Breeding-season. November to January.

MACGILLIVRAY collected this beautiful bird at Cape York, and it was described by Gould in the *Proceedings of the Zoological Society* of London for 1850. Simultaneously Gould brought before the British Association Meeting in the same year an account of Macgillivray's discoveries, quoting his letters. This account was printed by Jardine in his "Contributions to Ornithology" and the descriptions of the new species of birds were added. Owing to the delay in publishing the *Proceedings of the Zoological Society* Jardine's article appeared first and must be quoted as the earliest reference. In his letter Macgillivray wrote: "You shall have copies of my notes regarding their habits, made expressly for the supplement to your work." These notes read: "This pretty *Tanysiptera* is rather plentiful in the neighbourhood of Cape York, where it frequents the dense brushes, and is especially fond of resorting to the small sunny openings in the woods, attracted probably by the greater abundance of insect food found in such places than elsewhere. I never saw it on the ground, and usually was first made aware of its presence by the glancing of its bright colours as it darted past with a rapid, arrow-like flight, and disappeared in an instant among the dense foliage. Its cry, which may be represented by 'whee-whee-whee' and 'wheet-wheet-wheet,' is usually uttered while the bird is perched on a bare transverse branch or woody rope-like climber, which it uses as a look-out station, and whence it makes short dashes at any passing insect or small lizard, generally,

THE BIRDS OF AUSTRALIA.

returning to the same spot. It is a shy, suspicious bird, and one well calculated to try the patience of the shooter, who may follow it in a small brush for an hour without getting a shot, unless he has as keen an eye as the native to whom I was indebted for first pointing it out to me. According to the natives, who know it by the name of '*Quatawur*,' it lays three white eggs in a hole dug by itself in one of the large ant-hills of red clay which form so remarkable a feature in the neighbourhood, some of them being as much as ten feet in height, with numerous buttresses and pinnacles. I believe the bird also inhabits New Guinea; for at Redscar Bay, on the south-east side of that great island, in long. 146° 50' E., a head strung upon a necklace was procured from the natives."

Broadbent, writing of the "Birds of Cardwell and Herbert River (N.Q.)" (*Emu*, Vol. X., p. 235, 1910), recorded: "November: Common in all the scrubby mountain gullies and on the small scrubby creeks near the mountains in the Cardwell district. These birds come here about November and leave in February and early in March. They bore a hole into small ant-hills (termites), and lay four round white eggs. They look beautiful in their native state, flying about and showing their handsome white tails. A very shy bird, and hard to find in the dense scrubs where they live. Very common at Cape York."

Barnard's notes from Cape York read (*Emu*, Vol. XI., p. 24, 1911): "First observed on November 23, 1910, and a few days afterwards plentiful in the scrubs, but did not commence to burrow into the nests of the white ants (termites) until the end of December. These Kingfishers are migratory, but it is not known where they go. The first set of eggs was taken on 12th January, 1911, and a few days later large numbers could have been secured. The birds bred in the termites' nests, both on the ground and in the trees. Upwards of 50 nests have been examined by me, and the maximum number of eggs in a clutch was three. During the period of incubation the long white tail-feathers of the brooding bird become much worn, or are broken off."

These notes were absolutely confirmed by Macgillivray (the younger) (*Emu*, Vol. XIII., p. 161, 1914) at Cape York: "This species puts in its first appearance at the end of October or beginning of November, at or just before the commencement of the wet season, and soon starts nesting operations. For this purpose a low termite's nest on the ground, in the scrub, is chosen, and a hole, with nesting-chamber at the end, drilled into it. Occasionally a termite's nest in a tree is utilised, up to a height of ten feet. The termite's nest chosen is always an inhabited one, never

WHITE-TAILED KINGFISHER.

a dead mound. During the nesting-season this bird's trilling call may be heard all day long in the scrubs, from which it rarely emerges. The clutch of eggs is invariably three."

The preceding comprises all that is known of the life-history of this form, and its technical history is almost as brief. The genus name *Uralcyon* should be employed, as thereby is marked the distinction between this species and the more developed forms. This seems to be the least specialised, as the colour changes are more pronounced in the immature and adult, and further the tail is certainly more like the ancestral one, as its shape is comparatively normal, and the long tail-feathers, though they twist, do not show such a peculiar spatulate tip. It will be noted that it is migratory at Cape York and Cardwell, but whence it comes is not yet determined. It may simply cross Torres Straits, as, peculiarly enough, the Papuan territory exactly opposite is least known ornithologically. The bird Macgillivray mentioned from south-east New Guinea was described as a new species by Ramsay as *T. salvadoriana*, and though it has been more recently ranked as a subspecies only, it is fairly well differentiated from the Australian form. Moreover, it is a common breeding bird at that locality, and it does not seem a reasonable suggestion that our bird should migrate in that direction. Odd specimens have recently been procured in south-west New Guinea, and Ogilvie-Grant's conclusions read (*Ibis*, Jubilee Supplement No. 2, p. 219, 1915): "*Tanysiptera sylvia*. This immature male seems to agree in all particulars with examples of *T. sylvia* of a similar age from North-east Australia. I have also compared it with the type specimens collected by Macgillivray at Cape York, and after making due allowance for differences of age, it agrees perfectly with these. Dr. van Oort records an immature female from Sabang, on the Lorentz River, as undoubtedly referable to *T. s. salvadoriana* Ramsay. This is the form found in south-east New Guinea with a lighter blue crown and back and paler buff underparts. *T. sylvia* was believed to be confined to North-east Australia, and its presence on the Setakwa River is difficult to explain. It is not known to occur in the Aru Islands, where *T. hydrocharis* Gray is found. . . . In the British Museum there is an adult from the Owen Stanley Mountains, presented by Capt. F. R. Barton, which is intermediate between *T. sylvia* and *T. s. salvadoriana*; it has the crown and wing-coverts purplish almost as in *T. sylvia*, while the underparts are pale buff as in *T. s. salvadoriana*."

I have examined the specimen referred to above, and it suggests to me a different subspecies. The obvious differences Ogilvie-Grant ascribed to immaturity, but no specimen from Australia exactly matches it. I am

THE BIRDS OF AUSTRALIA.

unable to make "due allowance for differences of age" with any certainty and I do not conclude that "it agrees perfectly." The fact that van Oort determined his specimen as the other race indicates re-examination when more specimens are available. It is also noteworthy that the specimen which Ogilvie-Grant considered immature was killed on November 5, 1912, the date the Australian birds are fully plumaged. It cannot therefore be definitely accepted that the Australian birds migrate as far to the north-west as the Setakwa River.

I separated the Tully River birds as being paler below, thus approaching the south-east New Guinea form, but until the exact relationships and migrations are better known, this subspecies may be ignored. There is, however, no reason why the more southern birds should not constitute a recognisable subspecies as their migration may be quite distinct from that of the northern birds. Such migrations are known in connection with Palæarctic birds, and may occur in Australia as will be shown in connection with the Cuckoos later in this volume.

A peculiar coincidence must here be recorded. Since the above was written I have been visited by Dr. Macgillivray and Mr. W. Maclellan, the discoverers and explorers of the Claudie River and Lloyd's Bay district. Ignorant of the views I have expressed above, they informed me that to their knowledge the birds which migrated from New Guinea to the above named district did *not* pass through Cape York, but followed the old land line now represented by the Great Barrier Reef. This unexpected confirmation of my conjecture is worthy of great emphasis, and the subspecific state may thus be explained in such migratory birds. As these well-known naturalists are also familiar with the Cape York fauna, they could speak with authority, especially as the migration of North Australian birds had peculiarly interested them.

GENUS—COSMAEROPS.

COSMAEROPS Cabanis und Heine, Mus. Heine, Vol. II,
p. 138, 1860 Type *C. ornatus*.

MEDIUM Meropine birds with long arched bills, long wings, long tails with attenuate centre feathers and small legs and feet. The bill is long and arched, laterally compressed, strongly keeled on the culmen, side slopes steep, tip pointed: the under mandible is similar in formation following the shape of the upper. The nostrils are circular apertures placed at the base of the bill, midway between culmen ridge and lateral edge and almost hidden by stiff bristles, probably altogether in life.

The wing is long with the first primary minute: the second longest, the rest successively shorter, secondaries short. The second, third and fourth primaries are narrow, the rest broader, all with the tips sinuate.

The tail is long with the feathers broad, the tips sinuate save those of the two middle feathers which are attenuate and lengthened, but the attenuate portion bears scarcely any web. Otherwise the tail is emarginate, consisting of ten feathers.

The tarsus is very short and naked, scutellate in front, reticulate behind. The toes are short, the inner free, a basal web only present, a little shorter than the outer, which is connected to the last joint with the middle toe which is not much longer. The claw of the middle toe, however, much exceeds in length the other claws. The hind toe is long, not much less than the inner toe: the claw is short.

In 1892, when the Picarian birds were catalogued by Sharpe in the *Catalogue of the Birds in the British Museum*, Vol. XVII., he concluded, under the heading Family Meropidæ: "In the determination of the genera of this family I have mainly adopted the conclusions of Mr. H. E. Dresser's 'Monograph' of the family. I think that he has recognised as many genera as can easily be diagnosed; but the position of the nasal apertures will probably be found to afford characters for further subdivisions of the genera. Unfortunately, the condition of dried specimens does not allow us to arrive at a satisfactory conclusion with regard to this character."

Practically Sharpe then used *only* the characters of the tail to distinguish

THE BIRDS OF AUSTRALIA.

the genera, which consequently were polyphyletic. This was recognised by the footnote, p. 59: "From the strong contrast of its colours and from its general appearance, this species looks like a *Melittophagus*, in which genus it has been placed by Mr. Dresser; but if *Melittophagus* is to be kept distinct from *Merops*, then *M. muelleri* must be referred to the latter genus, as it has the central tail feathers elongated."

To define all the genera admissible would have necessitated a monographic review of the Order, which could not be undertaken for the purpose of systematically placing only one bird. A short examination of Meropine birds, however, compelled the admission of the present species as representative of a genus *Cosmaerops*. It may be here recorded that the early monographers concluded that the only method of classifying Bee-eaters was to separate them into many genera. However, Sharpe admitted two genera for the bulk of the Bee-eaters, viz., *Melittophagus* and *Merops*, the former "with the centre tail feathers not elongated: the tail square" the latter "with the centre tail feathers elongated."

This division had been made by Boie in the year 1828.

Sundevall in 1849, separated another generic division, *Meropiscus*, for *Merops gularis* Shaw, and then Reichenbach, the splitter, monographed the group in 1852: he named eight additional subdivisions to which Bonaparte in 1854 added; and then Cabanis and Heine in 1860 still further extended the divisions. It is obvious then that there must be some peculiarities evident in the group to account for such action, and it is certain that lumping will not relieve the situation. Thus the tail characters cannot be contrasted against coloration as the latter is certainly more valuable. There is, however, little variation in coloration through a large number of species. To particularise, the present species is not very different in coloration and little in colour scheme from *M. apiaster*, the type of *Merops*. The latter is a larger bird, with a proportionately shorter bill, and the attenuate centre tail-feathers shorter and broader. Such a difference could justly be minimised, were it not for the fact that two species, *M. leschenaultii* and *swinhoi*, are quite comparable in coloration with *Cosmaerops ornatus*, but differ in lacking the attenuation to the middle tail-feathers. On this account they were placed by Dresser and Sharpe in *Melittophagus*, but they are very closely allied to *C. ornatus*, agreeing in structural characters also. Thus, these species have the first primary minute, whereas true *Melittophagus* have it noticeable, though small. Dresser and Sharpe placed *M. gularis* in *Melittophagus*, but it differs so absolutely in coloration that *Meropiscus* must be considered the most distinct genus in the group: as a matter of fact, its wing formation,

COSMAEROPS.

a factor neglected by Dresser and Sharpe, is quite peculiar. The general coloration evident in *Merops apiaster*, *M. ornatus* and *M. leschenaultii* shows that the tail has evolved its attenuation independent of colour change. The last named is the type of *Urica* Bonaparte *Consp. Vol Aniso*, 1854, p. 8, wherein he placed *M. ornatus*. This name is missing from the synonymy in the *Catalogue of the Birds in the British Museum*, Vol. XVII., p. 44, 1892. It has priority over *Cosmaerops*, and until the birds are anatomically examined it is imperative to admit *Merops*, *Cosmaerops* and *Urica* as of equal value, and as of generic rank. Otherwise no rearrangement could be accepted, as the last two are as closely related as the first two, judging from superficial characters. Cabanis and Heine, when they proposed *Cosmaerops* also added *Melittias* for the type of *Urica*, and naming this first it has also priority over *Cosmaerops*.

I must conclude that *Urica* and *Cosmaerops* appear to have evolved independently from the Meropoid branch, and that colour scheme is certainly much older than tail structure in this group.

COSMAEROPS ORNATUS.

BEE-EATER.

(PLATE 342.)

MEROPS ORNATUS Latham, Index Ornith. Suppl., p. xxxv., 1801 : New South Wales.

Variegated Bee-eater Latham, Gen. Synops. Birds, Suppl. II., p. 155, pl. 128, 1801.

Merops ornatus Latham, Index Ornith. Suppl., p. xxxv., 1801 ; Dumont, Dict. Sci. Nat. (Levrault), Vol. XX., p. 53, 1821 ; Gould, Birds Austr., pt. 7 (Vol. II., pl. 16), 1842 (June 1st) ; Bonaparte, Consp. Gen. Av., Vol. I., p. 162, 1850 ; Reichenbach, Handb. Merop., p. 68, 1852 ; Gould, Handb. Birds Austr., Vol. I., p. 117, 1865 ; Ramsay, Ibis, 1866, p. 326 ; *id.*, Proc. Zool. Soc., 1875, p. 582 (Q.) ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 47, 1875 ; Castelnau and Ramsay, *ib.*, p. 389, 1876 (Q.) ; Ramsay, *ib.*, Vol. II., p. 179, 1878 ; Dresser, Monogr. Merop., p. 51, pl. xiv., 1884 ; Ramsay, Tab. List Austr. Birds, p. 3, 1888 ; Sharpe, Cat. Birds Brit. Mus., Vol. XVII., p. 74, 1892 ; Hall, Key Birds Austr., p. 56, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 545, 1901 ; Lyons, Emu, Vol. I., p. 136, 1902 (Central) ; A. G. Campbell, *ib.*, Vol. II., p. 16, 1902 (Vic.) ; Hall, *ib.*, p. 51 (N.W.A.) ; Le Souëf, *ib.*, p. 151, 1903 (N.T.) ; Berney, *ib.*, p. 210 (N.Q.) ; Carter, *ib.*, Vol. III., p. 95, 1903 (M.-W.A.) ; Berney, Emu, Vol. IV., p. 45, 1904 (N.Q.) ; Lawson, *ib.*, p. 136, 1905 (W.A.) ; Hartert, Nov. Zool., Vol. XII., p. 215, 1905 (N.T.) ; Berney, Emu, Vol. VI., p. 44, 1906 (N.Q.) ; G. F. Hill, *ib.*, Vol. VII., p. 21, 1907 (Vic.) ; Austin, *ib.*, p. 32 (N.S.W.) ; M'Ilwraith, *ib.*, p. 87 (Q.) ; Ingram, Ibis, 1907, p. 401 (N.T.) ; Mathews, Handl. Birds Austral., p. 55, 1908 ; Ingram, Ibis, 1908, p. 467 (N.Q.) ; Cleland, Emu, Vol. VIII., p. 155, 1909 (N.W.A.) ; Whitlock, *ib.*, p. 188 (W.A.) ; Mathews, *ib.*, Vol. IX., p. 58, 1909 (N.W.A.) ; *id.*, *ib.*, p. 68 (N.T.) ; Gibson, *ib.*, p. 75 (S.W.A.) ; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 349, 1909 ; Hall, Emu, Vol. IX., p. 130, 1910 (S.A.) ; Crossmann, *ib.*, p. 150 (N.W.A.) ; Whitlock, *ib.*, p. 193 (W.A.) ; Howe, *ib.*, p. 230 (Vic.) ; Broadbent, *ib.*, Vol. X., p. 234, 1910 (N.Q.) ; G. F. Hill, *ib.*, p. 271, 1911 (N.W.A.) ; Barnard, *ib.*, Vol. XI., p. 24 (N.Q.) ; Sullivan, *ib.*, p. 117 (Vic.) ; Stone, *ib.*, Vol. XII., p. 117, 1912 (Vic.) ; Chandler, *ib.*, Vol. XIII., p. 37, 1913 (Vic.) ; Macgillivray, *ib.*, p. 161, 1914 (N.Q.) ; Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.) ; Cheney, *ib.*, p. 207, 1915 (Vic.) ; Sloane, *ib.*, Vol. XVI., p. 99, 1916 (N.S.W.) ; H. L. White, *ib.*, p. 220, 1917 (N.T.) ; Campbell and Barnard, *ib.*, Vol. XVII., p. 17, 1917 (N.Q.).



Roland Green .del.

Witherby & C^o

$\frac{2}{3}$
COSMAEROPS ORNATUS.
(AUSTRALIAN BEE-EATER).

BEE-EATER.

Mountain Bee-eater Lewin, Birds Austr., pl. II., 1808 ; *id.*, Birds New South Wales, pl. II., 1811.

Philemon ornatus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXVII., p. 423, 1818.

Merops tenuipennis ou *M. thouini* Dumont, Dict. Sci. Nat. (Levrault), Vol. XX., p. 52, 1821 : New South Wales.

Merops melanurus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 208, 1827 : New South Wales.

Merops lewini "Aliq" Bonaparte, Consp. Gen. Av., Vol. I., p. 162, 1850 : nom. nud.

Melittophagus ornatus Reichenbach, Handb. Merop., p. 82, 1852.

Urica ornata Bonaparte, Consp. Vol. Aniso, 1854, p. 8.

Cosmaerops ornatus Cabanis and Heine, Mus. Hein., Vol. II., p. 138, 1860.

? *Merops modestus* Oustalet, Bull. Hebdom. Assoc. Sci. Fr., Vol. XXI., p. 248, 1878 : D'Urville Island, New Guinea.

Merops ornatus ornatus Mathews, Nov. Zool., Vol. XVIII., p. 290, 1912.

Merops ornatus shortridgei Mathews, *ib.*, Strelly River, West Australia.

Cosmaerops ornatus ornatus Mathews, List Birds Austr., p. 150, 1913.

Cosmaerops ornatus shortridgei Mathews, *ib.*

DISTRIBUTION. Australia : not Tasmania.

Adult male. Fore-part of head and crown, hind-neck, upper back, upper wing-coverts, innermost secondaries and scapulars grass-green, rather brighter on the last with rufescent bases to the feathers ; lower back, rump, and upper tail-coverts pale blue with blackish bases to the feathers, outer-webs of primary-quills green, inner-webs and secondary-quills, except the innermost, rufous with black tips to both series of quills ; tail black with blue on the outer-webs of the outermost pair of feathers, the middle pair of feathers slightly tinged with blue at the base, those feathers are much extended beyond the others, and have a spatule at the ends ; nape and sides of hinder crown rufous, as are also the sides of the fore-neck and lower throat ; a supraloral streak of bright bluish-green ; lores, a line below the eye, and ear-coverts black like the triangular patch on the fore-neck ; a pale blue line along the cheeks ; chin and upper throat lemon-yellow ; breast and abdomen grass-green becoming blue on the vent and under tail-coverts where the feathers are white at the base instead of black as on the abdomen ; axillaries, under wing-coverts, and quill-lining pale cinnamon rufous, tips of quills below brown, a narrow line of green, composed of short feathers, along the margin of the wing below ; lower aspect of tail blackish. Eye red ; feet dark grey, bill black. Total length 265 mm. ; culmen 32, wing 110, tail 131, tarsus 9. Figured. Collected at Napier Broome Bay, North-west Australia, on the 5th of May, 1910.

Adult female. Similar to the adult male, but the colours not so pronounced.

Immature. Like the adult female, but duller in all the markings, tail-feathers equal ; no black throat or golden yellow on the back of the head.

Nest. A tunnel in the side of a bank.

Eggs. Clutch, five to seven, white and shiny, 21-22 mm. by 18.

Breeding-season. October to January.

IN the Second Supplement to his *General Synopsis of Birds*, Latham described the Variegated B(ee) E(ater) and gave a plate of it. He

THE BIRDS OF AUSTRALIA.

finished his description with the remarks: "The other feathers of the tail chesnut. This is said to be the *male* bird; I met with in it the collection of General *Davies*. In Mr. *Lambert's* collection of drawings, I observed one of these which I suspect to be the other sex . . . the two middle tail-feathers as in the other; the rest black. . . . Inhabits *New South Wales*, where it is known by the name of *Dee-weed-gang*."

When Vigors and Horsfield catalogued the Australian Birds in the Linnean Society's Collection, they described a species as *Merops melanurus*, observing: "In Dr. Latham's first description of his *Merops ornatus*, a New Holland species of this genus not in the Society's collection, a bird is alluded to, which was figured in Mr. Lambert's collection of drawings, and whose characters nearly accord with the bird before us. Dr. Latham conjectures it to be the female of *M. ornatus*. In the second edition of his work, he repeats the same observation, but does not refer to the specimen in the Society's museum. One of the birds, however, in the collection is a male, as we find recorded in Mr. Caley's notes. Dr. Latham's conjecture respecting sex consequently proves erroneous. And the two specimens from which our above description is taken, according in every particular with each other, and exhibiting a fine state of preservation, are so distinct from *M. ornatus*, that we cannot consider ourselves authorised to come at once to the conclusion that they are varieties of that species. The tail of our bird is black, which in *M. ornatus* is chestnut; and the fore-part of the head is of the same colour as the back, while in Dr. Latham's bird it is dull orange. (The bird which Mr. Lewin has figured in his *Birds of New Holland* (pl. 2) and which he has referred to Dr. Latham's *Merops ornatus*, seems rather to belong to our species). Both these species differ from the *M. viridis* of Linnaeus by their greater size; by the throat being orange-yellow instead of blue, and by having a conspicuous longitudinal streak of light blue immediately under the black band that passes beneath the eye. The *rectrices* also of the *Indian Bee-eater* are green above, while in the other two species they are either black or chestnut.

Mr. Caley informs us that the specimens in the Society's collection were brought to him dead: he never had an opportunity of seeing the bird in its living state. He was told that it was a bird of passage, and bred near the conflux of the Grose with the Hawkesbury River. Its nest was said to be in the sandy banks of the river. To one of the specimens the following note is appended: "Iris narrow, crimson: male, October 1804."

The name *ornatus* has been constantly associated with this bird,

BEE-EATER.

as the description applies, save that of the tail-feathers, and the coloration "chesnut" seems due to a pure error as only one rare Bee-eater has the tail so coloured, and this one was quite unknown in Latham's time.

When Sharpe discussed the Watling drawings, under No. 84 he wrote: "Latham described this species from a specimen in the collection of General Davies, but he mentions a figure as being among 'Mr. Lambert's collection of drawings.' The figure in Latham's work is an impossible one, whereas Watling's figure is by no means bad. He gives the following note: 'The same size as the bird this drawing was taken from; the colours are more brilliant. Native name *Dee-weed-gang*.'"

Captain S. A. White has written me as follows: "The Bee-eater was a spring and summer migrant to the Reedbeds in years gone by. Fifteen or twenty years ago there was never a summer passed without seeing many of the Bee-eaters, now I have heard them once only in the last ten years. I have met with these birds all over the country of the Mac-Donnell Ranges, but strange to say did not meet with the bird in the far North-west Expedition of 1914, yet found them numerous in the sand-hills bordering the Nullarbor plain. This bird is not only likened to the rainbow in coloration, but it has the most exquisite flight. They burrow into the ground and lay up to six round eggs, perfectly white."

Mr. Thos. P. Austin has written me: "The Bee-eater is a very common species throughout the summer months; they prefer the more open river flats, more especially where the timber is dead, to the thick forest country, but their most favoured situation is near post and rail fences on sandy soil, in which they start to make their mouse-like nesting holes soon after they arrive: in this district, Cobbora, New South Wales, they usually choose a perfectly flat piece of ground, or on the side of an old dug-out, but filled-in, rabbit burrow. I have never known them to nest in a bank of any description. Their nesting burrows always slope downwards, the egg-chamber generally being at least a foot beneath the surface, and about three feet from the entrance. Like with the rabbit burrows, I often wonder what becomes of all the dug-out soil, as very little is to be seen outside the entrance, seldom more than what could be held in the two hands, and yet the egg-chamber alone is about the size of a large cocoanut. All the nests I have examined containing eggs, have been during the months of November and December, and always four or five eggs to a clutch. By the time the young are half feathered, the cavity containing them has a thick lining of beetles' wing cases, legs, etc., etc. Its food consists of all kinds of flying beetles and insects, most of which are obtained while on the wing. They will perch on a fence,

THE BIRDS OF AUSTRALIA.

a dead tree, etc., usually in pairs, and will sally forth on a short flight, after any passing insect, only to return to the same place to eat it, in much the same manner as an *Artamus*. Although I have kept several hives of bees in my garden for many years, I have never known them to be troubled by these birds."

Mr. Frank S. Smith reports: "This beautiful and curious bird eats, as its name implies, bees. But in the Victoria Valley, near Dunkeld (Vic.), where I found it fairly plentiful, a very observant bee-farmer told me that it is really a friend of the bee-keepers, for, though it certainly eats a few bees, it is death on the large dragon flies, who themselves are the veritable scourge of the bee-farmer and eat bees or rather suck them dry."

Mr. A. G. Campbell wrote me: "In company with Mr. G. E. Shepherd, at Somerville, I visited a road cutting where several pairs of this bird had begun to drill nesting burrows in November 1906. This is the furthest south the species has been yet recorded."

Mr. E. J. Christian, also from Victoria, sends me the following notes: "This bird is migratory and visits here in November. It rarely goes south of the Divide. It is generally around this part for the summer where it breeds. It does not do much harm to apiarists, and I think it attacks their enemies. A pair will sit in one place for a long while, preferably on a dry stick protruding from a green bough. I made some careful observations of one pair which were here for two or three weeks last summer. These two could always be found in the same place, and I used to watch them with the glasses. They would sit and watch, and as soon as a blowfly or beetle came past, the male would fly out and seize it and return to his mate and eat it. When the next came he would do likewise, but when he returned he held it out to her and she took it and ate it. I observed them also catching and eating the dragon fly, which I believe is a great enemy to apiarists. This pair of birds were very tame and took no notice of me at all. When disturbed, they utter notes very much like those of the Dotterel (*Poltohyas australis*). These birds go about in large flocks, and are often mistaken for a flock of parrots. Dates of arrival: Nov. 9, 1908: Oct. 27, 1909."

Mr. Edwin Ashby's notes read: "A few years ago these beautiful birds used to nest annually in the sides of a cutting at Happy Valley, a few miles to the south of Adelaide, but I am afraid they have left that locality. They make their long resting burrows in the sides of creek cut-outs near Callington and other places on the eastern slopes of the Mt. Lofty Ranges, South Australia. I have also seen them at Nackarn, 200 miles north of Adelaide. These birds hawk for insects in much the same graceful manner

BEE-EATER.

as *Artamus personatus*, and make a chattering or warning noise very similar. They are quite common in the middle country that borders the Murray River."

Mr. Sandland adds: "Very common at Moolah, South Australia, appearing in October and leaving in February or March."

Mr. A. G. Campbell, writing of the "Birds of North-eastern Victoria" (*Emu*, Vol. II., p. 16, 1902), states: "The Bee-eater (*Merops ornatus*) is another beautiful bird; it is found nesting about most of the sand ridges, drilling a long tunnel into the side of a ditch or road cutting, or even into a mere mound a few inches in height. After following the passage for 3 or even 6 feet, the four white eggs are reached, lying on the bare sand in the chamber. Strewn about are nearly always found the wing cases, legs and other hard parts of beetles, particularly cockchafers, the remains probably of food brought to the sitting bird. The Bee-eaters arrived in the district on 8th October and on 2nd October in the years 1899 and 1900 respectively, and the latest date on which they were seen was 22nd April."

Mr. Robert Hall in the same volume (p. 51,) gave Mr. J. P. Rogers' notes from the north-west of Australia: "There have been a few Bee-eaters here throughout the year, but they have increased greatly during the past month or two (April and May). At the present time (21/7/00), they are in small flocks and very plentiful. They have been noted to roost in branches like Wood-Swallows—remarkable. During March, 1900 (19th), I watched one with a grasshopper in its bill. It was beating it upon a limb, first to one side then to the other, and swaying its own body in the process—beat and sway—from side to side, for some minutes." Hall then added: "In the east this bird is strongly migratory, as far as may refer to north and south in Australia. I saw at Perth and Geraldton nesting birds in the November previous (1899). Would they have gone north over the great summer-time desert during the first week in February? In February of the same year (1900) I saw in Victoria large flocks. These latter went north soon after."

In the same journal Berney added (Vol. II., p. 210, 1903): "From my diary I take the following dates of arrival and departure: 1898, 2nd October, one seen, the first; 3rd October, numerous: 1899, 9th September, first birds seen: 1900, 1st September, first birds seen; 5th September, numerous: 1901, 25th August, fairly plentiful: 1902, 25th March, all disappeared suddenly. The winter of 1898 was exceptionally severe, which may possibly account for their late arrival. These notes refer to the Hughenden and Richmond districts, North Queensland." He added

THE BIRDS OF AUSTRALIA.

(Vol. IV., p. 45, 1904): "Following on my previous notes the first Bee-eaters to arrive in the spring of 1902 showed up on the 28th August. The succeeding winter (1903) they never left the district, a most unusual proceeding, more particularly as we had some pretty cold weather in June, with sufficient frost to kill the 'pigweed.' Up to the end of that month *Merops* were plentiful, but during July their numbers were greatly reduced, though still there were a fair number that were 'cracking hardy,' but the early part of August found us with only a few individuals. From this out they gradually increased again, and the summer of 1903-4 found them as plentiful as ever. On two occasions I watched the capture of specimens of the largest dragon flies; they were swallowed whole, wings and all, after a few blows on a dead limb to break their bones. They stayed a bit late last autumn, but were all gone early in June. Their migrations appear to be made in daylight, as between the 16th and 27th March this year I saw four flocks, consisting of 28, 50, 28, and 100 in number, pass overhead, fairly high up, their pipe attracting my attention. They were not hawking for insects, or sunning themselves, but attending strictly to business, keeping a straight line and going north-west. They were at the time crossing open, treeless downs, where as a rule they are never seen. In some data kindly forwarded me by Mr. Smedley it is curious to note that though the Bee-eaters remained here through the winter of 1903 they were quite absent at Homestead that year from May to 29th August."

F. Whitlock noted (*Emu*, Vol. VIII., p. 188, 1909): "Very common and I think resident, both on the Coongan and de Grey."

From Kimberley, North-west Australia, G. F. Hill recorded (*Emu*, Vol. X., p. 271, 1911) the following important items: "Birds were seen at frequent intervals during the ten months I spent in the district, but they rarely stayed more than a few days. It was almost impossible to follow their erratic movements through the timbered country with sufficient accuracy to determine their course. However, the following notes were recorded when favourable opportunities for observation occurred:—Small flocks arrived at Mission Station from the north on 18th and 22nd March. Small flocks passed over station on 27th April and 17th May, flying east. Numerous on Hecla Island 13th February; flew in south-easterly direction on leaving the island."

Macgillivray's records in the *Emu* (Vol. XIII., p. 161, 1914) are also valuable: "Mr. M'Lennan's notes on the movements of this bird are interesting when taken in connection with mine at Broken Hill. He writes (13th February, 1910): 'At Sedan, a large flock of Bee-eaters passed over the camp at dusk, going north.' My note on 24th January, 1910, at Broken

BEE-EATER.

Hill, is: 'Several flocks of Bee-eaters passing over the town, going north. Many young birds, still being fed by their parents, were with the flocks.' This migration occurs at about this time every year. It would appear that they go on to the Malay Archipelago and New Guinea, where they were noted by the B.O.U. expedition as being numerous after the month of April, though not met with previous to that date. It seems, however, that a few winter in North Queensland, as Mr. M'Lennan noted them at Caloola, beyond the Leichardt, in June, and obtained specimens further down the same river on 1st July. He also saw them at Cape Grenville in July of the following year. At Cape York they congregated in great numbers on 11th February, 1912, and then, gathering together, resumed their northward flight across the Strait."

Other notes referring to habits have been published, and Miss Cheney noted that "in 1914 the nestlings disappeared time after time from their nests, usually when they were almost fledged."

Sloane (*Emu*, Vol. XVI., p. 99, 1916) has explained that this was due to foxes who have almost exterminated them in this manner in the Mulwala district, New South Wales. He is very enthusiastic about the stupidity of introducing alien "pests," and of course every ornithologist must share in his anger at the extinction of native forms by such pests. There cannot be the least doubt that unwise introduction has caused the lessening of many endemic species, and it is quite probable that the extinction of the smaller Parrakeets is due to such a cause.

From the west I have Mr. Tom Carter's notes: "Fairly common in the Gascoyne districts and inland from Point Cloates through the winter months and until the beginning of December, when these birds apparently go to the south-west districts. They appeared very regularly every year about the middle of October at Broome Hill. Following are dates of first-noted arrivals: Oct. 17, 1907; Oct. 15, 1908; Oct. 25, 1910; Oct. 16, 1911; and Oct. 7, 1912. They seem much more in evidence on very hot days at Broome Hill, when they go in flocks and are very active. They are very good guides to locate 'nests' of wild bees in the hollow gum-trees. They used to dive right into the water at my stock tanks, catching bees and other insects on the surface of the water. I have found nests with eggs at Vasse in January in nesting cavities on *flat* open ground."

Dr. Cleland's notes are very important: "Oct. 13, 1906. Several seen at Perth for first time this year. Plentiful by the 20th. In Aug. 1907 they were plentiful at Strelly River, North-west Australia, sailing round water-holes, catching wasps, etc. Found them congregating together at night, usually flying from various parts to one particular spot and roosting together

THE BIRDS OF AUSTRALIA.

in low gums. They sat in rows, close together, as many as seven or eight being counted in one row; twenty to thirty were seen thus roosting for several nights in one small sapling. As the nights were very cold this may have been for warmth, or it may have been the congregating together before proceeding south. In September and October much fewer birds were seen, and these usually in pairs, the rest having evidently gone south. These pairs were nesting on the 22nd September, 1907, in a sandbank at the Strelly River. The tunnel ran about three feet in bank: four eggs partly incubated on the bare sand at the end of the tunnel, which was slightly widened. A few small land-snail shells and wasps' wings formed the nest. Oct. 10, 1908: First seen at Perth this year."

Mr. J. P. Rogers' notes are also valuable: "(Parry's Creek), March 16, 1909: Very numerous and in flocks sometimes. July 12, 1909, Mary River, 290 miles south of Wyndham: Very rare, only one pair seen. At Marngle Creek this species was very numerous. I often saw small flocks particularly on the sand-hills. At Mungi it was also numerous. I have never seen this bird nesting in Kimberley. . . . Nov. 27, 1911, Cooper's Camp, Melville Island: To-day I collected the only ones seen to date. The next were seen on Jan. 2, 1912, 10 miles S.E. of Snake Bay, and I saw apparently the same birds the following day, but did not see them again until I left this locality. On the 24th January, 1912, back at Cooper's Camp, I found these birds sparingly distributed and I saw them afterwards every day, until on Feb. 4 I noted: 'this species appears to be increasing numbers now,' and on the 9th Feb. 'Now very numerous: to-day I saw many birds.' . . ." With the preceding contrast the same observer's notes, taken at Thursday Island, just previously: "September 10, 1911. To-day many Bee-eaters were seen on migration from the islands to the north: were all travelling in a southerly direction, one little flock behind another. On the 11th, at Thursday Island, many hundreds of Bee-eaters passed over, all making for the mainland of Cape York. On the 12th I left Thursday Island at 4 p.m. for Port Darwin. This day I saw many at the Island, and at dusk a flock lit on the ship. Next day three were on the rigging. These were the last seen."

My last quotation will be read with interest by those who have carefully perused the preceding. Campbell and Barnard, in the *Emu* (Vol. XVII., p. 17, 1917) wrote: "Common about Cardwell in September, where they arrived from the north. They seemed to be moving southward. The first one we observed was on the 11th September. Broadbent first noticed Bee-eaters on 19th August 'in little flocks.' In October he saw them flying over Cardwell in thousands for days, going southward.

BEE-EATER.

“Bee-eaters have been observed passing to and from New Guinea during migration. How can it be possible, then, that there are two races of these birds in Australia, as Mathews infers?”

This inquiry suggests that the idea of migration is not at all understood by the writers. It may be that other Australian workers are also weak in this subject, so that I take a little notice of this question. The student who has studied my notes will know that there can be subspecies even among migrant birds. I do not propose to introduce examples from Palearctic forms but will simply deal with the present species. The Bee-eater is acknowledged to be a migrant, and it is also accepted on undeniable authority that it passes from Queensland to New Guinea. Further than that we have no proof. It is now known that many winter in *Eastern* Australia, while apparently Campbell and Barnard were unaware that it is resident in West Australia. Its movements are apparently north and south, and while on the east the northern birds pass into New Guinea, on the western they may not leave the continent. Thus, Macgillivray cites their wintering on the Leichardt: these may be southern birds, as local movements are common in partly migratory species. Therefore it is not only possible, but it is quite normal, for there to be races of such species. As a matter of fact, the western race of Bee-eater is quite a distinct form, while it is possible that were series collected systematically more than one race could be separated.

Since the preceding was written, Macgillivray and MacLennan have told me that two migratory routes occur in North Queensland, the birds from Lloyd's Bay going direct to New Guinea without passing through Cape York. This indicates two series in Queensland alone arriving from different sources which probably never meet. The large series of this species in the British Museum show many colour variations, but unfortunately there are rarely long series from definite localities. In a well-known peculiar genus little interest is taken by the collector or his principal, as “preconceived ideas” dismiss the differentiation of subspecies. Consequently an odd bird is procured and the species recognised and this is considered sufficient. When good material becomes available many subspecies will be recognised, as I can see differences among the extra-limital birds, but until the migration routes are known it would be unwise to distinguish many races. However, the West Australian form is so well marked that the specimens stand out in the boxes quite apart from all birds from other localities; while, on the other hand, a very dark form appears at the easternmost limit of its range.

I have included in my synonymy as questionably referable to the

THE BIRDS OF AUSTRALIA.

eastern race Oustalet's *Merops modestus* described from D'Urville Island, New Guinea. Oustalet's description was based upon an immature specimen, but series are not at hand to determine the subspecies from that locality. I admit two Australian subspecies as given in my 1913 "List," but suggest that more will be recognised when this bird is properly studied. Thus, I do not consider that the birds from Port Essington should be classed with those from Mid-west Australia, while it is doubtful whether the North Queensland, Cape York, birds can go with those from South Australia.

The chief work in connection with this species in Australia is the mapping of the migration routes: when this is done the discrimination of subspecies will be easy. No one has yet taken up this study seriously, though it was advocated many years ago and a few unconnected notes have from time to time been recorded.

To conclude, there can be subspecies of migratory birds, and in the present instance the western race is abundantly distinct and recognisable at sight. North noticed the difference, but laid no stress upon it.

GENUS—EUROSTOPODUS.

EUROSTOPODUS Gould, Synops. Birds Austr., pt. iv.,

App. p. 1, Apl., 1838 Type *E. mystacalis*.

Also spelt—

Eurostopus Sundevall Av. Meth. Nat., Disp. Tent. p. 86, 1873.

CAPRIMULGINE birds of normal size, lacking the stiff long rictal bristles of the typical genus.

The bill is minute, triangular, with gape very wide: the flattened tip is not curved, the culmen strongly keeled, sides horizontal showing the nostrils as tubes hidden by feathers: along the gape short soft bristles.

The wings are very long, the first primary longest with webs entire: the second and third a little shorter, the web scalloped on the outer edge; these constitute the tip, the fourth primary being much shorter and the others increasingly so, the secondaries also short.

The tail is very long and square, being more than half the length of the wing.

The feet are very small with the tarsus feathered. The toes are joined at their bases with a small web, the inner and outer being about the same length reaching only to the second joint of the middle one: their claws are small, but the claw of the middle toe is long and serrated. The hind toe is short, as is the hind claw.

In every structural detail, save the lack of the rictal bristles, superficially this genus agrees with *Caprimulgus*. Even in coloration it is a normal Caprimulagine bird. However, all over the world true Caprimulagine birds are found as well as abnormal members, showing variation in the way of crests, elongation of wing-feathers and peculiar tail formation. Also peculiar colour variations occur, in which the rictal bristles are present. Structurally, as regards internal features, these have been found to differ so remarkably that it must be conceded that the Caprimulagine forms are a very ancient group and the exact relationship of the species can only be gauged by osteological examination. In the present case we have another peculiar Australian group, two species being endemic and a third from New Guinea. It is remarkable that two species so much alike should occur together in Australia, and their distribution is not well defined owing to their close resemblance. In the immature of *Caprimulgus* the rictal

THE BIRDS OF AUSTRALIA.

bristles are present only as fine hair-like feathers exactly as seen in *Eurosotopodus*, the true strong characteristic bristles developing later. Hence it may be suggested that *Eurostopodus* shows an arrested stage of *Caprimulgus*, in which case it must have been isolated in Australia before the genus developed rictal bristles. Following this idea, it may be that the two species developed, one on the east side and the other the west, and then after the connection they came together, and from this the outlying New Guinea form was developed. Osteological comparison of the two species might give valuable results, but unfortunately material is not available, as neither of the birds are common even in bird skin collections.

Recently Oberholser has distinguished the American genus *Chordeiles* from osteological details as representative of a distinct family, and included *Eurostopodus*, as questionably a member, in the *Caprimulgidæ*. I have gathered no details, from the literature I have examined, of the osteology of *Eurostopodus*, so that probably Oberholser's caution will be fully justified.

Key to the Species.

- | | | |
|--|----|--------------------------------|
| White BAR on 3rd and 4th primaries on both webs | .. | <i>E. guttatus</i> , p. 227. |
| White SPOT on 3rd and 4th primaries on both webs | .. | <i>E. mystacalis</i> , p. 221. |



Roland Green, del.

Witherby & Co

$\frac{2}{3}$
EUROSTOPODUS MYSTACALIS.
(WHITE-THROATED NIGHTJAR).

EUROSTOPODUS MYSTACALIS.

WHITE-THROATED NIGHTJAR.

(PLATE 343.)

CAPRIMULGUS MYSTACALIS Temminck et Laugier, Planch. Color. d'Ois, 69^e livr., Vol. IV., pl. 410 (Oct.) 1826 : New South Wales.

Caprimulgus mystacalis Temminck et Laugier, Planch. Color. d'Ois, Vol. IV., pl. 410 (liv. 69), 1826.

Caprimulgus albogularis Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 194, 1827 : New South Wales.

*Eurostopodus** *albigularis* Gould, Synops. Birds Austr., pt. iv., p. 1, Apl., 1838; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 142, Dec., 1838; *id.*, Birds Austr., pt. 9 (Vol. II., pl. 7), 1842 (1st Dec.); *id.*, Handb. Birds Austr., Vol. I., p. 96, 1865; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 113; *id.*, *ib.*, p. 581 (N.Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; North, Austr. Mus. Cat., No. 12, p. 28, 1890; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 607, 1892; Hall, Key Birds Austr., p. 55, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 535, 1901; Batey, Emu, Vol. VII., p. 4, 1907 (Vic.); Mathews, Handl. Birds Austral., p. 55, 1908; North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 330, 1909; Broadbent, Emu, Vol. X., p. 234, 1910 (N.Q.); Wilson, *ib.*, Vol. XII., p. 32, 1912 (Vic.); Mathews, Nov. Zool., Vol. XVIII., p. 290, 1912; Macgillivray, Emu, Vol. XIII., p. 161, 1914 (N.Q.); Campbell and Barnard, *ib.*, Vol. XVII., p. 17, 1917 (N.Q.).

Caprimulgus albimaculatus "Cuv." Bonaparte, Consp. Gen. Av., Vol. I., p. 62, 1850 : nom. nud.

Eurostopodus mystacalis Mathews, List Birds Austr., p. 151, 1913.

Eurostopodus mystacalis victoriae Mathews, Austral Av. Rec., Vol. III., p. 58, 1916 : Victoria.

DISTRIBUTION. Queensland; New South Wales; Victoria; South Australia.

Adult male. General colour above black or dark brown mottled and freckled with grey or whitish on the head, back, wings, and tail spotted and irregularly marked with buff on the wings, scapulars, sides of face and chin; the frecklings on the head and hind-neck very fine, with broad black longitudinal lines, upper back similar but rather coarser, the grey marking on the lower back almost obsolete; lesser upper wing-coverts and bastard-wing black with small buff spots and circles and grey mottlings and irregular buff markings on the median series; scapulars

* Also spelt *Eurostopus*.

THE BIRDS OF AUSTRALIA.

similarly marked as are also the innermost secondaries; outer greater coverts, primary-coverts, and flight-quills spotted or blotched with buff, the four outer primaries spotted with white and mottled with grey at the tips; upper tail-coverts and tail coarsely mottled with grey and buff on the inner-webs of the outer-feathers of the latter; a white band across the lower throat; fore-neck and upper-breast dark brown mottled with grey; lower-breast, abdomen, under tail-coverts, sides of the body, axillaries, and under wing-coverts barred with buff and dark brown, more coarsely marked on the under tail-coverts; major under wing-coverts and under-surface of the quills pale brown with white spots on the primaries and buff bars on the secondaries and buff mottlings on the innermost secondaries; lower aspect of the tail dark brown with coarse buff mottlings. Eyes hazel; feet fleshy-brown; bill slate-grey. Total length 325 mm.; culmen 12, wing 261, tail 155, tarsus 22. Figured. Collected at Olinda, Victoria, on the 12th of October, 1912.

Adult female. Similar to the adult male.

Nest. None made, the single egg being deposited on the ground.

Eggs. Clutch, one. Ground-colour buff or stone, sparingly spotted with black markings, some appearing as if beneath the surface 37 to 39 mm. by 26-28. (Dawson River, October.)

Breeding-season. October to December or January.

IN 1827, when Vigors and Horsfield published their good account of Australian birds from specimens in the Collection of the Linnean Society, they described a specimen received from Mr. Caley, under the name *Caprimulgus guttatus*, which will be next treated. As a footnote they added: "The following species of this genus, which has been kindly lent to us by Mr. Leadbeater for description, was received from New Holland, and does not appear to have been hitherto recorded"—naming it *Caprimulgus albogularis*.

Gould's account is the most complete I have met with; thus he wrote: "During my visit to Australia I had frequent opportunities of observing this species. How far it may range over the Australian continent is not known; the south-eastern are the only portions in which it has yet been discovered. I have seen specimens in collections formed at Moreton Bay, and I have killed three or four individuals of an evening on the cleared lands in the neighbourhood of the Upper Hunter, which shows that it is far from being a scarce bird in that part of New South Wales. In all probability it is only a summer visitant in the colony, for it was at this season only that I observed it. In the daytime it sleeps on the ground on some dry knoll or open part of the forest, and as twilight approaches sallies forth to the open glades and small plains or cleared lands in search of insects; its flight, which is much more powerful than that of any other species of the family I have seen, enabling it to pass through the air with great rapidity, and to mount up and dart down almost at right angles whenever an insect comes within the range of its eye, which is so large and full that its powers of vision must be very great. Most

WHITE-THROATED NIGHTJAR.

of those I shot were gorged with insects, principally coleoptera and locusts, some of which were entire, and so large as to excite surprise how they could be swallowed; in several instances they were so perfect that I preserved them as specimens for the cabinet. Of its nidification I have no reliable information to furnish; but that it deposits a single egg on the bare ground is very probable. Contrary to what might have been expected, I found that although the sexes are nearly alike in colour, the females always exceed the males in size and in the brilliance of the tints; the males, on the other hand, have the two white spots on the third and fourth primaries more conspicuous than in the female. This species has very large and lustrous black eyes, which clearly indicate that it is a nightflier; its wings are very long; its tarsi short and partially feathered; and the stiff rictal bristles of the typical *Caprimulgi* are absent."

Captain S. A. White has written me: "This was a common bird at the Reedbeds not so many years ago, but they have now disappeared. The last one which came under my notice was in 1915. They sit upon the ground in the daytime and become an easy prey to domestic cats. I met with them in numbers in the Mallee country in 1916, and have heard them call at night in the interior, but never succeeded in taking a skin; they hawk at night, starting just at dusk."

Mr. Edwin Ashby has sent me the following for criticism, under date July 25, 1917: "I have only handled four specimens referable to this genus. The first was sent me by Mr. C. E. May from Anson Bay, Northern Territory, and is now in your collection. The late Mr. A. J. North commented on this specimen as follows: 'The white spots on the outer-web of the third and fourth primaries are absent.' The second was sent me in the flesh from Cowra Creek, near Bredbo, New South Wales, and on skinning it was found to be a female in which the white spots on the primaries are absent. This specimen you also have. The gentleman who sent it me told me that this species visited their district only for a part of the year and invariably used to perch in the early night-time on the chimney of their cottage, making its peculiar call. From the localities one would expect the foregoing to be referable to *E. mystacalis*. The third was shot by myself in the Mallee country that lies between the River Murray and the Victorian border, Head of Ettrick, on Sept. 28, 1911. I shot it on the border of the Mallee in a wheat paddock. Immediately on death five cockchafer beetles crawled up the gullet and out of the mouth, none the worse for their temporary imprisonment. I slept out one night in the bush in the adjoining hundred a little later in the year and heard these birds calling in all directions after dark. One would conclude that there must have been at least half a dozen birds calling. My fourth

THE BIRDS OF AUSTRALIA.

specimen I shot on April 10, 1917, in the daytime at a place about twenty-five miles north of Adelaide, called Buckland Park. The bird was sitting on the ground, only flying up when I was within thirty yards. The locality was covered with tall scattered Ti tree (*Melaleuca ericifolia*). A comparison of this skin with the preceding shows that the latter is considerably more rufous than the Mallee bird, but the Buckland Park bird is a male, whereas the preceding is a female. Throughout the underside the dark markings and barring are darker and the light markings uniformly rufous. The central tail-feathers have large rufous spots which are quite absent from the Mallee bird. The white spot on the first primary in the Buckland Park bird is not circular, but a large blotch extending broadly to the edge of web, also most of the white spots on primaries have some rufous edging. I cannot recognise any pointed difference in size. Mr. F. E. Howe informs me that all the eggs obtained in the Mallee have the greenish hue attributed to *E. argus*. The probability is that the four skins herein noted represent the two species, that is, if one is justified in making two species out of this decidedly variable bird. I do not consider that one would be justified in separating them on the egg difference, viz., greenish in *E. argus* and cream in *E. albogularis*."

Broadbent (*Emu*, Vol. X., p. 234, 1910) wrote: "This is a common bird in the Cardwell district. It camps on the bare ground in the daytime, and at dusk flies over the open grass flats, catching moths. The edge of the scrub is its favourite hunting ground. I have sometimes shot four or five specimens at dusk near Cardwell. It is very Hawk-like in its flight. Common in the Cairns district, along river flats and scrub pockets, in the rainy season."

Campbell and Barnard (*op. cit.*, Vol. XVII., p. 17, 1917) record from the same locality that "a few birds were flushed from the ground in stony places."

The following notes from Mr. Thos. P. Austin are very interesting: "To anyone who is only out of doors during the day, the White-throated Nightjar would appear to be exceptionally rare. During the fifteen years I have lived here, only a half dozen of them have come under my notice during daylight, but while fishing along the banks of the Talbragar River, and at lagoons, shortly after sunset, the great numbers to be seen, makes it appear to be marvellous how so many escape notice during the day. To identify them I shot two one night, and found their stomachs full of large beetles of several species, one large mantis, grasshoppers, moths, etc., etc. Only twice have I seen their nest. On October 28th, 1910, my dog flushed a sitting bird from a fresh egg, on the side of a rocky ridge, on the edge of a big scrub, the egg being simply laid on eucalypt leaves. The other nest was near the bank of the Myall Lake,

WHITE-THROATED NIGHTJAR.

eastern New South Wales, on October 27th, 1912, from which two birds were flushed. It was beneath a bush on sandy ground, just a few scattered leaves being about the spot, and it contained a newly hatched young bird, which was clothed in a mass of coffee-coloured down. Although I have seen great numbers of these birds at night, I have never yet heard them utter any note. From what little experience I have had with them during the daytime, I find they will allow themselves to be almost trodden upon before they will take wing, and then they usually only fly a short distance, but if marked down and followed up for a second inspection, they will flush before the intruder is within twenty yards of them. They have an extraordinary serrated formation along the inner side of the middle claw, somewhat resembling the gills of a fish, but even in life it is of a hard substance, but what this is used for I have never been able to discover. Upon handling one of these birds, the first thing that struck me as peculiar was the extraordinary lightness of them, their weight did not appear to be much more than that I would have expected simply from a skin and feathers of a bird of this size."

Mr. J. W. Mellor has written me: "The White-throated Nightjar is not a common bird on the Adelaide Plains, although I have often seen it at the Reedbeds, where it prefers country of a sandy nature, and well clothed with trees and bushes; its habits are to settle on the ground, where there are a lot of leaves and sticks about, and here the coloration of its feathers so assimilate the surroundings that it can hardly be seen until one is close upon the bird and it is flushed and sails away with noiseless flight to settle again a short distance ahead. The feathers are very soft and downy, and so the flight is very noiseless, and it can catch its insect food with ease. It is nocturnal in its habits, sallying forth at dusk and settling down to sleep on the ground before daybreak. It lays its single egg in the open, but this is so like the dusky ground upon which it is placed that with a few scattered spots upon the surface it can be seen only with great difficulty, and one may tread upon it before knowing it is near. I have seen the species on Eyre Peninsula in June, 1911, in the Mallee country, where it was sitting on the ground and rose up hurriedly, only to drop again to the earth fifty to sixty yards ahead. During the dusk it can be seen sailing about after insects and moths in the open places between the trees, and over the low scrub."

Mr. F. E. Howe wrote me: "I have never seen this bird in the flesh, but it was heard round our camp fire at Carina in the Mallee scrub." Mr. C. McLennan informed me that he has often flushed them during his peregrinations in this locality, adding that "they rise from your very

THE BIRDS OF AUSTRALIA.

feet and appear to be in for a good long fly, when suddenly they drop down and always alongside a stick, and they appear to take on the appearance of a stick themselves, and are consequently very hard to pick out from the surrounding debris. The call is a very weird one when heard away back in these scrubs, and is something between a croak and a scream, and is uttered at fairly long intervals. It appears to be fairly rare."

Batey (*Emu*, Vol. VII., p. 4, 1907) recorded: "On coming to Sunbury (Victoria) in 1846, saw it frequently; after that year noticed it hunting at dusk. Between 1855 and 1860 flushed one from the ground not far from our residence. Since then, though moving about much in and out, I have never met this bird."

This is a rare bird with a small range and there is little on record of its scientific history. It was apparently recognised as a new Nightjar by Temminck about the same time as Vigors and Horsfield had differentiated it. The latter's name was accepted until I showed that the name given by the former was published first. Bonaparte cites a name given by Cuvier, who had, probably earlier than either of the two above named, discriminated it, but he frequently did not publish his results. There is apparently yet confusion, as will be noted from Ashby's notes between this and the succeeding species. As few localised skins are available its distribution is not exactly determined, but it is fairly certain it does not extend to New Guinea, as given by Hartert in the *Catalogue of the Birds in the British Museum*, Vol. XVI., p. 608. The genus does not appear to have been met with in New Guinea by the recent Dutch and British Expeditions, the genus *Lyncornis* being represented instead. Therefore Ogilvie-Grant suggests that *Eurostopodus astrolabæ* Ramsay described from South-east New Guinea may be a synonym of *Lyncornis papuensis* Schlegel, apparently following Salvadori's determination which is given in a footnote by Hartert, *loc. cit.*, p. 606.

In connection with the succeeding species, I comment upon the determination of the species called *Caprimulgus guttatus* by Vigors and Horsfield, and which Hartert concluded was the juvenile of the present species.



Roland Green. del.

Witherby & Co

$\frac{3}{2}$
EUROSTOPODUS ARGUS.
(*SPOTTED NIGHTJAR*).

Order CAPRIMULGIFORMES.

No. 396.

Family CAPRIMULGIDÆ.

EUROSTOPODUS GUTTATUS.

SPOTTED NIGHTJAR.

(PLATE 344.)*

CAPRIMULGUS GUTTATUS Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 192, 1827 : Parramatta, New South Wales.

Cuprimulgus guttatus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 192, 1827.

Eurostopodus† guttatus Gould, Synops. Birds Austr., pt. iv., App. p. 1, 1838 (Apl.); *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 142, Dec., 1838; *id.*, Birds Austr., pt. 9 (Vol. II., pl. 8), 1842 (1st Dec.); *id.*, Handb. Birds Austr., Vol. I., p. 98, 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; North, Austr. Mus. Cat., No. 12, p. 27, 1890; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 536, 1901; Le Souëf, Emu, Vol. II., p. 93, 1902 (N.T.); Berney, *ib.*, Vol. VI., p. 43, 1906 (N.Q.); Chandler, *ib.*, Vol. XIII., p. 37, 1913 (Vic.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.).

Eurostopus argus Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 608, 1892 : East Australia = Victoria (?); Hall, Key Birds Austr., p. 55, 1899; *id.*, Emu, Vol. II., p. 50, 1902 (N.W.A.); Carter, *ib.*, Vol. III., p. 95, 1903 (N.W.A.); Hartert, Nov. Zool., Vol. XII., p. 217, 1905 (N.T.); Mathews, Handl. Birds Austral., p. 55, 1908; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 333, 1909; Gibson, Emu, Vol. IX., p. 75, 1909 (S.W.A.); Crossmann, *ib.*, p. 150, 1910 (N.W.A.); Whitlock, *ib.*, p. 193, 1910 (W.A.); Howe, *ib.*, p. 230 (Vic.); G. F. Hill, *ib.*, Vol. X., p. 272, 1911 (N.W.A.); Stone, *ib.*, Vol. XII., p. 117, 1912 (Vic.); G. F. Hill, *ib.*, p. 256, 1913 (N.T.).

Eurostopodus argus argus Mathews, Nov. Zool., Vol. XVIII., p. 290, 1912; *id.*, List Birds Austr., p. 151, 1913.

Eurostopodus argus harterti Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912 : Newery Station, Northern Territory; *id.*, List Birds Austr., p. 151, 1913.

DISTRIBUTION. Australia : not Tasmania.

Adult female. General colour above silvery-grey, minutely freckled and broadly and narrowly streaked with dark brown, also blotched and freckled with buff—the dark pattern on the middle of the crown and nape broad, the feathers margined

* The plate is lettered *Eurostopodus argus*.

† Also spelt *Eurostopus*.

THE BIRDS OF AUSTRALIA.

on one side which are minutely freckled with black; an ochreous-buff collar on the hind-neck; the dark shaft-lines very narrow on the hind-neck, upper back, inner scapulars, and upper tail-coverts becoming broader and margined with buff on the middle of the back and outer scapulars; marginal upper wing-coverts dark brown with buff margins, the remainder of the upper wing-coverts freckled with grey and broadly tipped with buff; bastard-wing, primary-coverts and flight-quills dark brown with large rounded spots of buff on both webs which take the form of bars on some of the inner secondaries and frecklings and blotches on the innermost secondaries; the outer primary has a white spot on the inner-web, the second one blotched with white on both webs leaving the shaft black, and the third and fourth are broadly banded with white, including the shafts, the primaries are also more or less marked with grey near the tips; tail dark brown or black mottled with grey and barred with buff; sides of face, chin, and throat dark brown with buffy-white edges to the tips of the feathers; a white V-shaped mark on the lower throat, some of the feathers of which are tinged with buff and have blackish edges; sides of neck, fore-neck, and upper-breast dark brown at the base with fawn-coloured tips to the feathers, somewhat darker on the middle of the fore-neck and rather paler on the centre of the breast, the feathers on the lower-breast broadly margined with fawn colour; abdomen and sides of the body fawn colour with narrow brown sagittate bars; under tail-coverts, axillaries, and under wing-coverts almost uniform fawn colour, the last having a few dark markings on the outer margins; greater under wing-coverts and quills below dark brown spotted barred, or mottled with fawn colour or smoky-white; lower aspect of tail pale brown barred, spotted, or mottled with sandy-buff or greyish-white. Eyes violet-purple, feet grey, bill horn, base of lower mandible fleshy. Figured. Collected at Bell Bird Bore, Mallee, Victoria.

Adult male. Similar to the adult female.

Immature male. General colour above cinnamon-rufous, including the head, back, scapulars, and upper wing-coverts, with dark brown mottlings to the feathers, the dark pattern sometimes take the form of spots which may be observed on the top of the head, in others it assumes the shape of arrow-heads; nape, mantle, and scapulars dark brown finely mottled or vermiculated with grey or buffy-white, some of the lesser upper wing-coverts similar but somewhat more coarsely marked; bastard-wing, primary-coverts and flight-quills dark brown, inclining to black on the primaries, the feathers spotted or mottled with buff or cinnamon-rufous, the first or outer four primaries marked with white which is restricted to the inner-web on the first, extending beyond the shaft on the second, and crossing both webs on the third and fourth, the buff markings assume the form of mottled bars on the inner-webs of the secondaries; the innermost secondaries like the back; tail dark brown mottled with grey and buff and cinnamon-rufous at the tips, the grey mottling is more conspicuous on the middle feathers, the buff take the form of dentations on the inner-webs of the lateral feathers; a white patch across the throat which is more or less tinged with buff; sides of face, chin, upper throat, breast, and under tail-coverts cinnamon-rufous with dark brown bars or mottlings to the feathers, very sparsely on the under tail-coverts; abdomen, axillaries, and under wing-coverts paler and inclining to buff; the greater series of the last and under-surface of the flight-quills dark brown spotted or mottled with buff and marked with white on the four outer primaries; lower aspect of tail also dark brown mottled, and notched on some of the feathers with buff. Eyes black, feet brownish, bill blackish. Collected at Normanton, Gulf of Carpentaria, North Queensland, on the 19th of November, 1913.

- *Immature female.* General colour of the upper-surface cinnamon-rufous with dark mottlings or wavy bars to the feathers including the head, upper back, scapulars, upper wing-coverts and innermost secondaries; one feather on the middle of the

SPOTTED NIGHTJAR.

crown of the head almost entirely black ; some of the feathers on the nape, upper back, scapulars, and upper wing-coverts grey finely vermiculated with brown more coarsely on the lower back and upper tail-coverts ; bastard-wing, primary-coverts, greater upper wing-coverts and flight-quills dark brown with buff spots on the outer-webs and incomplete bars of the same colour on the inner ones, some of the secondary-quills tipped with buff, most of the primary-quills mottled with rufous at the tips—the outer ones darker and inclining to blackish with an incomplete band of white on the first four which commences on the inner-web of the outer-quill and becomes more or less smoky on the fourth one ; tail dark brown profusely mottled with grey on the middle-feathers and more coarsely marked with cinnamon-rufous and buff on the lateral ones, where it assumes the form of mottled bars, there is more or less cinnamon-rufous on the central feathers which is more pronounced at the tips ; sides of face, a line above the eye, and chin dark brown with buff or cinnamon tips to the feathers ; a V-shaped patch of white on the throat ; lower throat and upper-breast cinnamon with narrow dark brown bars, some of which are acuminate in form ; lower-breast, abdomen, sides of body, axillaries, and under wing-coverts fulvous with narrow dark bars, the inner under wing-coverts, lower flanks, vent and under tail-coverts almost uniform fulvous, the under tail-coverts are very soft and fluffy in texture ; greater under wing-coverts, inner primary- and secondary-quills below dark brown marked with buff or pale fulvous, outer flight-quills almost uniform dark brown with an incomplete band of white on the four outer feathers ; lower aspect of tail dark brown profusely marked with mottled bars of buff. Collected on the Mary River, Northern Territory, on the 3rd of May, 1895.

Nestling. “ Of a reddish-brown colour ” (Gould).

Nest. None made, the egg is deposited on the ground.

Egg. Clutch, one, ground-colour yellowish-olive, sparingly spotted with reddish-purple or lavender spots. 32-34 mm. by 24-25. (September, Dawson River.)

Breeding-season. September to December.

As noted in connection with the preceding species, this form was characterised by Vigors and Horsfield under the name *Caprimulgus guttatus*, these authors writing : “ The only specimen of this bird contained in the Society’s collection was injured before it came into the hands of Mr. Caley. It is, however, sufficiently preserved to show the genus to which it belongs, and to afford a clear specific distinction. The bill has all the characters of that of the true *Caprimulgus*, being weak, narrowed, and much compressed at the *apex*, with round and elevated nostrils ; the legs also, like those of the same genus, are short, weak, and feathered to the toes, which are uneven, and have the middle nail serrated. The wings are more rounded than in other *Goatsuckers* ; but this apparent deviation from the genus is probably owing to the mode in which the specimen has been prepared. The plumage above is nearly perfect ; and the wings exhibit without any deficiency the beautiful series of regular round spots described above, from which the specific name has been derived. But the plumage of the abdomen, and of the underparts generally is defective. Mr. Caley informs us that the bird was picked up dead

THE BIRDS OF AUSTRALIA.

on his premises in its present imperfect state, and was supposed to have been killed by a cat. Its native name, he adds, is *Wat'watkin*."

Gould's account reads: "As the similitude of its form would lead us to suspect, this species closely resembles the preceding, both in its habits and in the whole of its economy; unlike that species, however, whose range of habitat would appear to be very limited, the present bird is universally, but thinly, distributed over the whole of the southern portion of Australia. I killed it in South Australia and in New South Wales: the collection formed by Gilbert at Swan River contained specimens which presented no difference whatever, either in size or markings, and I have since seen examples from the north-west coast. During my rambles in New South Wales I more than once flushed this bird in open day, when, after mounting rapidly in the air, it performed a few zig-zag evolutions and pitched again to the earth at a distant spot. That it breeds on the ground there can be no doubt, as I found a newly-hatched young one on the precise spot from which I had flushed the adult; the little helpless creature, which much resembled a small mass of down or wool, was of a reddish-brown colour, not very dissimilar from the surface of the ground where it had been hatched; my utmost endeavours to find the broken shell were entirely unavailing. . . . The sexes are so nearly alike in colour and size that they are not to be distinguished except by dissection; the young, on the contrary, is clothed in a more buffy-brown dress until it has attained the size of the adult."

Kearland's notes of his experience with this species during the Calvert Expedition (*Trans. Roy. Soc. S. Austr.*, Vol. XXII., p. 136, 1898) read: "During the early part of our journey the peculiar note of this bird gave rise to a considerable amount of speculation as to its origin, but at Mount Campbell I not only got the required information from the natives, but also satisfied myself by shooting the bird whilst uttering it. This note consists of a "caw, caw, caw, gobble, gobble, gobble." In the whole of the desert these birds are seen after the sunset skimming over the tops of the spinifex in search of insects, but camp fires possess a strong attraction for them in the form of winged insects attracted by light. Whilst on watch on the night of August 17th, I counted ten birds flying round the burning spinifex at one time. Although seen far into the desert at night, they prefer rocky country in which to pass the day. On the hillside, near Mount Campbell, I disturbed fourteen birds from about half an acre of ground, and subsequently flushed several lots of five or six, but never saw one perch. They appear to spend all their time on the wing or ground."

Howe (*Emu*, Vol. IX., p. 230, 1910) recorded *Eurostopus argus* from the Victorian mallee, writing: "This nocturnal bird was noticed on two occasions.

SPOTTED NIGHTJAR.

On 6th October, Mr. Ross flushed a pair that were lying on the ground close to a few dead sticks. The female was secured, and on dissection was found to contain an egg that would have been laid within a week. On the 3rd October, another bird was flushed from a thick patch of short mallee."

Mr. Tom Carter's notes read: "The Spotted Nightjar was fairly common on the ranges from Point Cloates to the North-West Cape, but this conclusion was formed more from *hearing* the birds while camping out at night than from seeing them, as in the daytime they sit closely on the ground under the shelter of a bush, and will not rise unless approached very closely. Then they do not fly far. They could be heard, and sometimes seen, as they flitted about my camp fires, and their peculiar cry was a puzzle to me for a long time, as I found it difficult to shoot one at night when they were on the wing, and I believe only once succeeded in doing so, and this was at Winning Pool, about sixty miles east of Point Cloates. In the drought of 1889-91 I was camped out near the North-West Cape for many months and they were in numbers about the camp fire. Mr. G. A. Kearnland has well described their cry as 'Caw-caw-caw gobble-gobble-gobble.' The first part, slightly *crescendo*, and the latter *diminuendo*. They were occasionally noted by me on the ground in scrub in the Gascoyne district, but they seem to like the vicinity of ranges and rough country best. They were never seen or heard by me in the south-west."

Mr. J. P. Rogers has written me: "At Marngle Creek only one was seen, and at Mungi one was heard at night close to my camp, but none were seen. This species is usually found in stony country in this district, and is often seen hawking for insects in the twilight. I have always found it more numerous around the Grand Range than elsewhere in Kimberley."

Berney (*Emu*, Vol. VI., p. 43, 1906) recorded *Eurostopus guttatus* from the Richmond district, North Queensland, observing: "This species is only an occasional visitor. I have seen it three years out of the last five, and my notes then are confined to the period August to January."

Berney is a most accurate observer, so that it is possible that both species occur in North Queensland, all other records being allotted to the other species.

When Hartert monographed this group in the sixteenth volume of the *Catalogue of the Birds in the British Museum*, the names in common use for the two species were those put forward by Vigors and Horsfield and accepted by Gould. Hartert, however, placed *C. guttatus* as a synonym of *C. albigularis*, writing: "This name has constantly been applied to the smaller species, but on examining the type in the British Museum, I find that it is a nestling of *E. albigularis*, and not of the smaller form. As the description of this bird is not sufficient to recognise the species,

THE BIRDS OF AUSTRALIA.

I prefer the name *C. albigularis*, published in the same article." For the smaller form he then proposed the new name *Eurostopus argus*.

The argument produced by Hartert is not conclusive, as, if he were able to determine to which species the nestling belonged, the description must have been applicable to that species alone. Nevertheless, the authority of a British Museum Catalogue was all-powerful, and though Australian ornithologists might rebel, Hartert's nomination became acceptable to extra-limital workers. Consequently these names were used by me in my "Handlist" which was based on Sharpe's "Handlist." My first revision, undertaken for the preparation of my "Reference List," made me doubt the accuracy of Hartert's association, and I therefore placed *C. guttatus* as a doubtful synonym of *E. albigularis*. If it had been certain, I should have used it, as it had precedence. For my "List of the Birds of Australia" I again considered it and retained it doubtfully as synonymic, but at this time it had lost its importance in this connection, as I had discovered that Temminck's name *C. mystacalis* had priority over both *C. albigularis* and *C. guttatus*. My present study has shown, as far as can possibly be expected, the absolute recognition of Vigors and Horsfield's *C. guttatus* in its pre-Hartertian accepted usage for the smaller species.

Hartert reported that the type of *C. guttatus* was a nestling: this was not at all suggested in the original description, wherein it is stated that "the wings are more rounded than in other *Goatsuckers*; but this apparent deviation from the genus is probably owing to the mode in which the specimen has been prepared." As the type is a nestling it shows no primaries, and the roundness of the wing is based upon the secondaries. It is a beautiful rufous bird, and at the time Hartert wrote the British Museum had no series showing the plumage changes of the two species. One bird, however, referable to the larger species showed a rufous tendency, and from this Hartert assigned the nestling to that form. However, I have recently received specimens of the immature male and female of the smaller species, which I have described in detail, and these agree so minutely with the nestling as to place beyond reasonable doubt the identity of this with the smaller species. Peculiarly enough, North, usually antagonistic to such changes as that proposed by Hartert, acquiesced in this alteration, as he stated the larger species was common near Sydney, where Caley's specimen was procured, while the smaller one was not. However, the smaller one was known from New South Wales, and the conditions now are very different from those prevalent in Caley's time. However, with the specimens I have before me, no other conclusion save the one I have arrived at seems possible.

SPOTTED NIGHTJAR.

Hartert accepted as referable to this species "Fichtel's Goatsucker" described by Latham (*Gen. Hist. Birds*, Vol. VII., p. 345, 1823) as follows: "Size of the European Species: Bill moderately large, dusky; plumage in general dark greyish-brown, marked all over with white, circular, ringlike spots, of the size of peas; on the quills about five or six on each side of the web; legs weak.

Inhabits New Holland; communicated by M. de Fichtel, who described it to me from memory; but in whose possession the specimen was, when he related the circumstance."

I can see no character in this description to allow the allotment of the name to this species.

In my "Reference List," published in the *Nov. Zool.* (Vol. XVIII., Jan. 1912), I admitted two subspecies:

Eurostopodus argus argus (Hartert). Victoria.

Eurostopodus argus harterti.

"Differs from *E. a. argus* in being darker above and below.

Northern Territory.

Northern Territory, North-west Australia, South-west Australia."

I maintained these in my "List," the range of the former being given as "Queensland, New South Wales, Victoria."

Although I have specimens from Victoria, I note that none were catalogued by Hartert at the time he proposed the name, his description being based on all the series. His name was taken from a *nomen nudum* given to an Aru Island specimen, and he had no Aru Island specimens before him. I therefore select the Specimen "e Ad. sk. S. Australia = New South Wales. Capt. Sturt [C]" as the type bird of *Eurostopus argus* Hartert.

The names of the subspecies will now read:

Eurostopodus guttatus guttatus (Vigors and Horsfield).

Type locality, New South Wales.

Of this *E. argus* Hartert becomes a synonym and the range would be Northern Territory (Eastern), Queensland, New South Wales, Victoria. The "S. Australia" of Captain Sturt was the interior of New South Wales, though very probably this species does occur in South Australia.

Eurostopodus guttatus harterti (Mathews). Northern Territory.

The range at present is Northern Territory (Western) and Western Australia.

GENUS—ROSSORNIS.

ROSSORNIS Mathews gen. nov. Type *R. macrurus*.

CAPRIMULGINE birds of medium size, with small bills with huge gape, long wings, long tails and very small legs and feet.

The bill has a small flat tip, triangular with culmen keeled and sides flattened: the tip is decurved, bluntly hooked. The nostrils exist as circular tubular apertures situated on each side of the culmen near the base. The lower mandible is very flat with extensive rami, the tip very small and spoon-shaped, fitting into the tip of the upper mandible. There is a row of strong projecting bristles along the upper edge of the gape.

The wing is long with feathers broad and inner-webs fringed: the outer-web of first primary is entire, but that of the second, third and fourth webs is scalloped. The tip consists of four feathers, the fifth being much shorter than the first, which is exceeded in length by the fourth. The third primary is the longest, while the second is longer than the fourth.

The tail is long, about two-thirds the length of the wing, and is rounded in shape, the feathers broad and ten in number.

The legs are very small, the tarsus entirely feathered: the toes are short and covered with scutellate scales: the fore toes are joined at their bases with small webs, the hind toe free. The outer and inner are subequal, but much shorter than the middle toe. The claws on all the toes except the middle one are very small: the claw of the middle toe is long with the inner edge expanding and serrated. The number of phalanges in the outer toe are four only.

The above description is compiled from *Caprimulgus macrurus* Horsfield, which is here generically separated from *Caprimulgus* as I find it differs in an essential feature, viz., the wing-structure. In *C. europæus* the tip of the wing consists of three feathers only, the fourth being much shorter. The second primary is longest, but little exceeds the first which is slightly longer than the third. In addition the plumage of *C. europæus* is much harsher, and the tail is less rounded and shorter in proportion.

In this order the birds are superficially so alike that it becomes difficult to distinguish them by external features. In the present instance the wing-formation is a striking item and can justly be deemed of generic import. I,

ROSSORNIS.

note, however, that many of the species referred to *Caprimulgus* have a similar wing-formation, while others agree with *C. europæus* in that feature. Hartert admitted forty-three species in his genus *Caprimulgus*, concluding: "The American species cannot be separated generically." Ridgway negatived this, accepting *Antrostomus*, proposed for *C. carolinensis*, as a valid genus, and remarked that this was abundantly distinct from *Caprimulgus europæus*, and very probably some of the other species classed in *Caprimulgus* were also separable. I am certain of this, but only here name one new genus, which I propose for *Caprimulgus eximius* Temminck. This is probably the most beautiful of the order, the glorious golden coloration being very attractive. It is well differentiated by means of this coloration, but in addition the wing has the tip composed of four primaries, the second and third subequal, the latter probably a little the longest, the first subequal to the fourth. The tail is long and square, but the legs are long for this group, the tarsus being longer than the middle toe and claw and, moreover, naked for more than half its length. This species was not in the British Museum when Hartert wrote his Catalogue, and thus his character for the genus *Caprimulgus*, where this was included, reads: "Tarsus more or less feathered in front, shorter than middle toe with claw." As this would thus appear an essential structural feature I propose the new genus name: EXIMIORNIS for *Caprimulgus eximius* Temminck.

As noted above, probably many more genera would be discriminated were this group critically studied in a systematic manner.

ROSSORNIS MACRURUS.

LARGE-TAILED NIGHTJAR.

(PLATE 345.)*

CAPRIMULGUS MACRURUS Horsfield, Trans. Linn. Soc. (Lond.), Vol. XIII., p. 142, 1821 : Java.

Caprimulgus macrurus yorki Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912 : Cape York, North Queensland.

Caprimulgus macrurus Gould, Birds Austr., pt. 17 (Vol. II., pl. ix.), 1844 (1st Dec.) ; *id.*, Handb. Birds Austr., Vol. I., p. 100, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.), 1875, pp. 113, 581 (Q.) ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878 ; *id.*, Tab. List Austr. Birds, p. 2, 1888 ; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 537, 1892 ; Hall, Key Birds Austr., p. 54, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 534, 1901 ; Hartert, Nov. Zool., Vol. XII., p. 217, 1905 (N.T.) ; Mathews, Handl. Birds Austral., p. 56, 1908 ; Macgillivray, Emu, Vol. X., p. 217, 1910 (N.Q.) ; North, Austr. Mus. Spec. Cat., No. 1, Vol. II., p. 329, 1909 ; Broadbent, Emu, Vol. X., p. 234, 1910 (N.Q.) ; Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.) ; Macgillivray, *ib.*, Vol. XIII., p. 161, 1914 (N.Q.) ; H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

Caprimulgus macrurus yorki Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912 : Cape York, North Queensland ; *id.*, List Birds Austr., p. 152, 1913 ; Oberholser, Proc. U.S. Nat. Mus., Vol. 48, pp. 591-2, 1915.

Caprimulgus macrurus keatsi Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912 : Point Keats, Northern Territory ; *id.*, List Birds Austr., p. 152, 1913 ; Oberholser, Proc. U.S. Nat. Mus., Vol. 48, pp. 591-2, 1915.

DISTRIBUTION. Northern Territory ; North Queensland.

Adult male. General colour of the upper-surface black, dark brown, and pale earth-brown varied by white tips or bars, buff bars, and isabelline mottlings to the feathers. Crown of head and hind-neck pale earth-brown minutely vermiculated with whitish, the feathers on the central portion broadly marked with black, which forms a longitudinal line, some of the lateral feathers have very narrow shaft-lines ; mantle, back, upper tail-coverts, and middle tail-feathers dark brown or blackish with buff, whitish, or pale brown bars and mottlings to the feathers ; the outer tail-feathers marked only on the margins ; the outermost pair broadly tipped with white ; scapulars pale earth-brown finely vermiculated with whitish, lined with buff and broadly tipped or margined with black ; lesser upper wing-coverts blackish barred

* The plate is lettered *Caprimulgus macrurus*.



Roland Green, del.

Witherby & C^c

$\frac{2}{3}$
CAPRIMULGUS MACRURUS.
(LARGE TAILED NIGHTJAR.)

LARGE-TAILED NIGHTJAR.

and edged with buff, becoming paler on the median and greater series, which have pale frecklings and rather broad white tips to the feathers; bastard-wing, primary-coverts, and quills marked with ferruginous-buff on both webs, the outer primary-quills uniform black towards the tips, which have pale mottlings, and a white spot on the inner web of the first, or outer primary which occurs on both webs of the following three, the innermost secondaries much paler and very finely mottled with whitish; rectal bristles white at the base and black on the apical portion; chin and sides of the face dark brown, freckled with buff becoming ferruginous on the latter; middle of throat white with black tips to the feathers; sides of the neck black fringed with buff at the tips of the feathers; fore-neck and breast dark brown finely vermiculated with whitish and some of the feathers somewhat broadly margined with white at the tips; abdomen, sides of the body, under tail-coverts, and under wing-coverts brown barred with buffy-white; under-surface of quills and tail dark brown, marked more or less on the basal portion with a blotch of white on the quills and white tips to the outer tail-feathers. Eyes brown; feet brown; bill brown, tip black. Total length 300 mm.; culmen 11, wing 190, tail 150, tarsus 16. Figured. Collected on Melville Island, Northern Territory, on the 29th of May, 1912.

Adult female. Similar to the adult male, but the outer-web of the primaries lighter.

Nestlings have the feathers on the upper-surface marked with reddish-buff and dark brown; the under-surface barred brown and dirty white.

Nest. None made; the eggs are deposited on the ground.

Eggs. Clutch two, ground-colour pinkish-stone, with underlying spots of lavender or grey. (Cairns, October.)

Breeding-season. September to November.

CONFINED to the far north there is practically no life-history known of this member of the typical *Caprimulgine* forms.

Gould wrote: "This, the only true *Caprimulgus* known to inhabit Australia, is, I believe, identical with the *C. macrurus* of Horsfield, whose specimens were procured in Java, while those I possess were obtained at Port Essington, where the bird is moderately plentiful; it is also found in Southern India, hence it has an unusually wide range of habitat. It frequents the open parts of the forest, and is strictly nocturnal; it mostly rests on the ground on the shady side of a large tree close to the roots, and if disturbed several times in succession takes to the branch of one of the largest trees. I have never seen the eggs of this species, but I possess a young bird apparently only a few days old, which Gilbert found lying under a shrubby tree, without any nest or even a blade of grass near it; the little creature was so similar in colour to that of the ground upon which it was lying, that it was with difficulty detected, and he was only induced to search for it from the very peculiar manner in which the old bird rose, the reluctance it evinced to leave the spot, and its hovering over the place it had risen from, instead of flying off to the distance of nearly a hundred yards, as it usually does."

I give here J. P. Rogers' notes made on Melville Island: "Oct. 10, 1911. Cooper's Camp. Since coming here I have heard a bird in the man-

THE BIRDS OF AUSTRALIA.

groves every evening at dusk. I did not know the call; it sounded as if some one was tapping the end of a log with a hammer. This knocking could be heard for a considerable distance. This evening I saw a bird flying into a mangrove just at dusk. I fired and got one of these birds. This bird was making the knocking sound.

"Nov. 8, 1911. To-day I found two young ones: the old bird flew up, and on looking to see if there were any eggs I saw the two young: they were crouched down just above the highwater mark of that morning. I dropped my hat over them and looked for the old bird; she had only flown a few yards and was flapping and struggling on the ground. I stepped back a few yards and the old one flew into a mangrove close to the young ones. Dec. 16, 1911. Are still heard occasionally at dusk. Jan. 20, 1912. None were seen on my way over to the north side nor on my way back, and none were seen or heard at the locality ten miles S.E. of Snake Bay. None have been heard since my return here. Feb. 5, 1912. Several have been heard in the last few nights. Excepting the bird seen with the young ones I never saw one of this species in daylight until to-day, when I flushed one in a dense patch of mangroves. These birds seem to stick to the mangroves here: they are usually heard either in or on the outskirts of mangrove thickets or else on the foreshore."

Mr. Edwin Ashby wrote me that he had received several specimens from Port Keats, Northern Territory, from Mr. C. E. May, who stated they were common there.

Its scientific history is almost as brief. In the *Catalogue of the Birds in the British Museum*, Vol. XVI., 1892, Hartert gave as *Hab.* of the species: "The typical form is found in Queensland and Northern Australia, many of the Papuan Islands, throughout the Malay Archipelago, in Cochin China, Siam, the Malay Peninsula, and Tenasserim. Specimens from Tenasserim, Burmah, Assam, and Manipur are more or less allied to *C. albonotatus*, which, in fact, is merely a western subspecies of *C. macrurus*. At a time when very meagre materials were available for comparison, Dr. Sharpe separated the small dark form from Northern Borneo under the name of *C. salvadorii*. Now, however, since large series from almost all localities are in the British Museum, it becomes obvious that it is impossible to separate the birds inhabiting North Borneo as a species. They belong to the well-pronounced dark insular forms. Some specimens are exactly similar to those from Waigiou and other islands. The wing measures 7 to 7.4 inches."

When I prepared my "Reference List to the Birds of Australia" (published in the *Nov. Zool.* Vol. XVIII., Jan. 1912, I regarded the Australian forms as representing two subspecies, thus (p. 291) —

Caprimulgus macrurus yorki.

LARGE-TAILED NIGHTJAR.

" Differs from *C. m. macrurus* in its smaller size: wing 179 mm. (typical birds 190 mm.).

North Queensland (Cape York).

Caprimulgus macrurus keatsi.

" Differs from *C. m. macrurus* in its paler coloration as well as smaller size.

Northern Territory (Port Keats)."

These forms were accepted in my "List of the Birds of Australia," published in 1913, but are here augmented. A few remarks are necessary, however, as recently Oberholser has given in the *Proc. U.S. Nat. Mus.*, Vol. 48, pp. 587-99, published May 3, 1915, a "Synopsis of the Races of the Long-tailed Goatsucker, *Caprimulgus macrurus* Horsfield." His conclusions may be here digested: nine subspecies were recognised; to quote the author's words, "not a large number, considering the great range of the species." These were

Caprimulgus macrurus macrurus (Horsfield).

Java, Borneo, Labuan Island, Palawan
and Calamianes Islands in the Philip-
pines, etc., etc.

Caprimulgus macrurus mesophanis (Oberholser).

Molucca Islands.

Caprimulgus macrurus yorki (Mathews).

Cape York, Northern Australia.

Caprimulgus macrurus keatsi (Mathews).

Northern Territory of Australia, New Guinea,
New Britain Island, Aru Islands, and
probably also the Timorlaut Islands.

Caprimulgus macrurus anamesus (Oberholser).

Singapore Island and Sumatra.

Caprimulgus macrurus bimaculatus (Peale).

Malay Peninsula, north to Tenasserim,
Burmah, Assam and Province of Yunnan,
south-western China, and east to Siam,
Cambodia and Cochin China.

Caprimulgus macrurus albonotatus (Tickell).

North-eastern India.

Caprimulgus macrurus nipalensis (Hartert).

Nepal.

Caprimulgus macrurus atripennis (Jerdon).

Eastern Ghauts, Southern India.

THE BIRDS OF AUSTRALIA.

It seems very possible that the Indian forms may later be specifically separated and more subspecies be there recognised, especially as Oberholser was dependent on published accounts only for his knowledge of these birds. His material consisted of "three specimens" from "India" so that he could not determine with any accuracy the relationship of the birds. My friend Mr. Stuart Baker is now criticising the fine collection of Indian birds brought together by Hume and now in the British Museum, and from his local knowledge of Indian topography finds many easily recognisable races which have been hitherto overlooked. I therefore leave this problem in his safe hands for solution, with the sure anticipation of fair treatment and discrimination of the necessary subspecific forms.

Oberholser lumped the birds from Java and Borneo under the name *C. m. macrurus*, though the latter had a name available in *Caprimulgus salvadorii* Sharpe. I conclude that the Bornean race is recognisable with the name

Rossornis macrurus salvadorii (Sharpe)

and will quote Oberholser's measurements in this connection. He gives as the wing measurements of four Javan birds, 170, 180.5, 176.5, 178 mm., with an average of 176.2 mm.; six birds from Labuan and Northern Borneo read 183, 182, 175, 186, 188, 179 mm. averaging 182.2 mm. There is thus an appreciable difference in size, which is borne out by noting that only one of the four Javan birds reaches 180 mm., while only two of the Bornean birds fall under that range. In addition the Labuan birds are slightly darker than the Javan ones, so that a good subspecific distinction is seen. It becomes absolute when we consider Oberholser's new subspecies *C. m. mesophanis* characterised as "Like *C. m. macrurus* from Java, but much larger." Wing 189 mm. As his Bornean birds considered typical measure up to 188 mm., the difference in size should not have been expressed by the words "much larger." However, to deal with his remarks concerning Australian forms is my object here. Accepting *C. m. yorki* from Cape York he wrote: "This subspecies I have not seen, and if Mr. Mathews' measurements (wing 179 mm.) represent the average size, the race is but possibly distinguishable. It comes very close to *Caprimulgus macrurus macrurus*, but which seems to be practically identical in size, not smaller as Mr. Mathews says in the original description, for he compared it evidently with the large form here separated as *Caprimulgus macrurus mesophanis*, instead of with the typical small bird from Java. I am here recognising it largely on account of its isolated range as compared with *Caprimulgus macrurus macrurus*, and in the probability that careful comparison will reveal characters to separate it from the latter race."

Then under *Caprimulgus macrurus keatsi* he wrote:

"The single Australian specimen (from Port Essington) examined indicates

LARGE-TAILED NIGHTJAR.

that this is a recognisable race. Mr. Mathews in his original description states that it is *smaller* than *Caprimulgus macrurus macrurus*, but here again he has doubtless made comparison with *Caprimulgus macrurus mesophanis* instead of the typical race from Java. This Australian bird is apparently of the same size as *Caprimulgus macrurus macrurus*, but is distinguishable by its paler coloration, particularly on the upper parts. So far as I am able to judge from the limited series at my command, birds from New Guinea, allowing for the usual range of individual variation, do not differ in either size or colour from typical *Caprimulgus macrurus keatsi* of the Northern Territory in Australia." He then refers to this form, as well as the Port Essington specimen three birds from Port Moresby, New Guinea. A little local knowledge would have enabled Oberholser to negative such an incongruous association, as the birds of Port Moresby have no geographical connection with those from Port Keats. A careful criticism of Australian specimens, using Oberholser's standard for subspecific differentiation, will allow four subspecies in Australia, with no known extra-limital range at present.

Thus

Rossornis macrurus yorki (Mathews).

Cape York, North Queensland.

These agree with my original description in being smaller than *C. macrurus salvadorii* from Labuan, which was the form I accepted as typical at the time I made my comparison. Peculiarly enough, as I have just shown, this is a larger form than typical *C. macrurus macrurus*, but when Oberholser suggested I had compared my birds with his *C. macrurus mesophanis* he overlooked this fact and still considered Bornean birds as typical. Six Cape York specimens give wing measurements: 176, 174, 181, 178, 172 and 178, averaging 176.5 mm. I find the Cairns birds to measure appreciably larger and, moreover, to be paler on the under-surface with the bars more regular. The wing measurements of four birds read: 184, 185, 190, 194, averaging 188.2 mm. This agrees with Oberholser's *C. m. mesophanis* in measurement, but are quite separable from the preceding, so that I propose

Rossornis macrurus coincidens subsp. n.

Cairns, Queensland.

As in the case of *C. m. yorki* my comparison of my *C. m. keatsi* was made with the Labuan specimens and consequently must be corrected as Oberholser states in regards to typical Javan birds. I have since received a series from Melville Island which I did not separate at the time, but which now seems necessary in view of Oberholser's results. Five specimens measure in the wing 178, 187, 189, 187, 187, averaging 183.6 mm. These are notably larger than the Cape York birds as well as paler than the Port Keats series, the

THE BIRDS OF AUSTRALIA.

latter having a much more reddish coloration. I therefore name the Melville Island form

Rossornis macrurus rogersi subsp. n.

This leaves the mainland western Northern Territory form to bear the name

Rossornis macrurus keatsi (Mathews).

Oberholser's range is not in any way possible as it is confined as far as yet known to that locality. It is possible that it might occur on the Timorlaut Islands, but certainly never at Port Moresby, New Guinea. The last named would be much nearer to the Cape York series from which it differs in its paler coloration and apparently a little larger in size.

The New Guinea and Aru Islands form require strict examination, as Hartert stated Borneo specimens were like Waigiou birds, while Ogilvie-Grant, recording ten specimens from the Mimika and Wataikwa Rivers, South-west New Guinea, did not discuss the species at all, writing: "This series of the Large-tailed Nightjar does not differ in any way from typical examples from Java."

Oberholser also includes in the range of *C. m. keatsi* the Aru Islands, while Berlepsch records a specimen from that locality as typical *C. macrurus* with a wing length of 174 mm.

G. R. Gray considered the Aru birds with those from Waigiou and Dorey, North-west New Guinea as separable and introduced a new name *schlegelii* but without description.

Oberholser cited Gray's name as a *nomen nudum*, indicating Dorey, New Guinea as the type locality. Why this was done I do not guess, as Oberholser had no birds from Dorey nor have I. It is now well known that the Aru Islands, Dorey, North New Guinea, and Port Moresby, South-east New Guinea, belong to distinct avifaunal regions. I would distinguish the Aru Island form as

Rossornis macrurus aruensis subsp. n.

Aru Islands.

This race is smaller than *C. m. salvadorii*, and, approaching that in coloration, is darker than *C. m. keatsi*. It is much smaller than *C. m. mesophanis*, its nearest geographical ally.

The New Britain birds are also recognisable as a distinct race. These are obviously darker than *R. m. yorki*, the nearest geographical named race and they measure slightly larger.

The races to be admitted at present are over fourteen:

Rossornis macrurus macrurus (Horsfield).

Java.

Rossornis macrurus mesophanis (Oberholser).

Molucca Islands.

LARGE-TAILED NIGHTJAR.

Rossornis macrurus salvadorii (Sharpe).

Labuan, Borneo.

Rossornis macrurus ambiguus (Hartert).

Tenasserim, Burmah, etc.

Rossornis macrurus bimaculatus (Peale).

Malay Peninsula, and Singapore Island,
Sumatra.

Rossornis macrurus albonotatus (Tickell).

North-eastern India.

Rossornis macrurus nipalensis (Hartert).

Nepal.

Rossornis macrurus atripennis (Jerdon).

Eastern Ghauts, Southern India.

Rossornis macrurus aruensis (Mathews).

Aru Islands.

Rossornis macrurus keatsi (Mathews).

Northern Territory.

Rossornis macrurus rogersi (Mathews).

Melville Island, Northern Territory.

Rossornis macrurus yorki (Mathews).

Cape York, North Queensland.

Rossornis macrurus coincidens (Mathews).

Cairns, North Queensland.

Rossornis macrurus subsp.

New Guinea.

Rossornis macrurus subsp.

New Britain.

From Oberholser's and my own investigations it seems certain that this bird shows an extraordinary number of subspecific forms and consequently at least four will hereafter be determined in New Guinea alone. It may be possible to run the continental forms along in series where their distribution is continuous, but island forms rarely take on a great similarity to the nearest geographical form but have more resemblance to a distant race. This was pointed out by Oberholser, and I have found it to be the case, working with a series of birds generally acting as a complement to his.

While the preceding account was in the press Rothschild and Hartert have published in the *Novit. Zool.*, Vol. XXV., May 1st, 1918, pp. 321 *et seq.* an account of this species. Their review is a striking example of the verification of subspecies when independent work is undertaken and no prejudice is allowed

THE BIRDS OF AUSTRALIA.

to enter into the matter. It also shows clearly the obsession with regard to island races I have previously indicated in connection with this work ; thus two males and one adult, one immature female from Sudest Island are separated from the New Guinea birds as a new distinct subspecies, the whole of the forms inhabiting New Guinea being lumped with the North Australian subspecies, Rothschild and Hartert writing : “ We do, therefore, not hesitate to call all the Papuan birds before us *Caprimulgus macrurus yorki*.” Their conclusions as to the forms recognisable read :

Caprimulgus macrurus meeki (Rothschild and Hartert, p. 321).

Sudest Island.

Based on four specimens showing little pronounced differences in any way, yet regarded as a “ nice new form ” darker than New Guinea specimens “ the wing shorter than Bornean.”

Caprimulgus macrurus macrurus (Horsf.).

Java.

Caprimulgus macrurus salvadorii (Sharpe).

Borneo and Palawan.

This form is only provisionally accepted as being “ somewhat larger.” As I have shown above that from Oberholser’s own figures the Bornean form is larger, it should be absolutely recognised. The differences seem more pronounced than those recorded for the new race from Sudest Island, Rothschild and Hartert introduce. Another new race is proposed as

Caprimulgus macrurus oberholseri (Rothschild and Hartert, p. 322)

for the birds from Lombok and Sumbawa.

Caprimulgus macrurus mesophanis (Oberholser).

Moluccan Islands.

Rothschild and Hartert accept this on coloration, confirming my note that in size it was not different.

Caprimulgus macrurus kuehni (Rothschild and Hartert, p. 322)

is proposed for four males and one female from Tual, Little Key, Key Islands, “ nearest to the Moluccan form, but the bars on the abdomen are generally narrower, and the wings are strikingly shorter. ‘ Males 175–177 mm.’ measurements of preceding, males 184–192 mm.”

Caprimulgus macrurus yorki (Mathews).

“ We have a large series of Goatsuckers of this species from New Guinea, *i.e.*, from various parts of British New Guinea and the foothills of the Snow Mountains, also a male from Andai, Arfak Peninsula, a young bird from Humboldt Bay, and an adult female collected at Korrido, October, 1896, by William Doherty. The latter, unfortunately, in very bad condition, appears to be darker, but all the others agree well with two skins from Cape York.

LARGE-TAILED NIGHTJAR.

From the examination of one skin from Northern Territory the supposed *C. m. keatsi* (Mathews) seems to us to be the same as *yorki*."

I have quoted this to show the lack of series from the mainland of New Guinea, especially as regards the distinct faunal divisions of the Arfak Peninsula and the North-west Coast. The Snow Mountain foothills also show a different avifauna to that of British New Guinea when series from these localities are criticised with the same detailed application as is paid to the few specimens from the minute Moluccan island groups.

Then was added :

Caprimulgus macrurus albolaxatus (Rothschild and Hartert, p. 323).

Type from Volcano Island, with which was associated New Britain examples. These were separated by means of tail coloration, a somewhat variable feature, but which may be used in connection with the general coloration as given above.

Rothschild and Hartert did not discuss the Indo-Malayan forms, but confirmed Kloss' note (*Ibis*, 1918, p. 95) that Oberholser's usage of names for the Malay Peninsula forms was incorrect, but also the doubt of their being two forms ; *anamesus* (Oberholser) being a pure synonym of *bimaculatus* (Peale), the form for which Oberholser accepted Peale's name bearing the name *ambiguus* (Hartert).

A difficult point arises in connection with the *nomen nudum schlegelii* as the Opinions indicate that it would become valid when cited in synonymy. In what connection it is difficult to decide, but probably the designation by Oberholser of Dorey, New Guinea would hold, and the name would be available for the form of which we have no series from that locality. It is important that rules should be made regulating the acceptance of *nomina nuda* quoted as synonyms, as sometimes the cases are very involved. Often they are simple, as in the case decided by the Commission, but more often they resemble the present case.

GENUS—Z O O N A V A .

ZOONAVA Mathews, Austral Avian Record, Vol. II., p. 112,

September 24th, 1914 Type *Z. francica*.

SMALLEST Micropodine birds, with very small bills, very long wings, medium forked tails and minute feet, the tarsus unfeathered.

The tip of the bill is minute, decurved, culmen ridge prominent, sides flattened; under mandible small, tip slightly upcurved. The nostrils appear as elongate ovals, placed in a membrane-covered depression and lying parallel to the culmen edge, not to the ridge.

The wings are very long, with the tip of three feathers, the second longest, the first equal to the third, the rest rapidly decreasing, all the feathers narrow and pointed; the secondaries very short.

The tail is comparatively long, almost half the length of the wing; it is well but not deeply forked, and the shafts are soft.

The legs and feet are small: the tarsus naked, the covering entire, neither are the toes reticulate or scutellate. The hind toe is long and pointing backward, the remaining three toes all pointing forward.

The present genus comprises the birds classed in the *Catalogue of the Birds in the British Museum* and generally since under *Collocalia*, but the type of that genus is *H. esculenta* Linné. This latter is a much smaller, differently coloured bird with a smaller (comparatively) bill, a shorter tail, not forked, scarcely emarginate and even more minute legs and feet. The coloration separates this as a different evolution product, as in the *Zoonava* coloured species three generic types can be distinguished; a larger form with a long even tail and a feathered tarsus. This has been named *Aerodramus* by Oberholser (*Proc. Acad. Nat. Sci. Philad.*, 1906, p. 182), the type being *Collocalia innominata* Hume.

The other is hereafter named, being the species *Chaetura grandidieri*, which was placed in the genus *Chaetura* because the tail-feathers have their shaft stiff and the tips projecting like needle-points. Otherwise in every detail of structure and coloration it agrees with the type of the present genus.

The order comprises a series of long-winged, small-footed birds which are generally recognised at sight, but which may not be homogeneous. Anatomical investigation has shown that the superficial likeness covers distinct forms, and it is possible that later the group may be split up. The bill is generally

ZOONAVA.

characteristic, as is also the wing-formation, the primaries being very long and narrow and rapidly decreasing, while the secondaries are very short, being exceeded by the shortest primary. The tail is square, or more or less forked, generally short; in some cases the shafts of the tail-feathers are soft and normal, in others the shafts are stiffened and the tips project beyond the webbing as needle-points. The legs show further differences: the toes are always four in number, but sometimes they are feathered, sometimes normal and naked; the tarsus is sometimes feathered, sometimes not, but when it is naked it generally shows neither scutes nor reticulations, but is complete and skin-like. The toes are diversely placed; sometimes all four toes point forward, sometimes two forward and two backward, and others normal, the hind toe alone pointing backward.

These differences have been used for the separation of the group into sections, but I do not consider them in that connection. It is certain that osteological results will show that such sections are useless. In this connection I might quote a statement regarding the diastataxy and eutaxy of the wing. Very few groups show both these conditions and the Swifts are one. Delbitt Miller (*Bull. Amer. Mus. Nat. Hist.*, Vol. XXXIV., 1915, p. 132) wrote:

“Groups containing both Eutaxic and Diastataxic forms, *Cypseli* (Swifts). Mostly eutaxic. *Streptoprocne* and *Collocalia* said to be diastataxic. *Dendrochelidonidæ* (all ?) diastataxic.”

It is noteworthy to find *Collocalia* and *Streptoprocne* together, because these are probably the most different superficially of all the genera of the group. If this statement be true, it suggests at once that little relationship (direct) can be considered to exist between these two and that the condition has independently evolved in these two genera.

Key to the Species.

Grey rump	..	..	..	..	..	..	<i>Z. francica</i> , p. 248.
No grey rump	..	..	..	..	..	..	<i>Z. fuciphaga</i> , p. 255.

ZOONAVA FRANCICA.

GREY-RUMPED SWIFTLET.

(PLATE 346.)*

HIRUNDO FRANCICA Gmelin, Syst. Nat., p. 1017, 1789: Mauritius.*Cypselus terræreginæ* Ramsay, Proc. Zool. Soc. (Lond.), 1874, p. 601, 1875: Cardwell, Queensland.*Cypselus terræreginæ* Ramsay, Proc. Zool. Soc. (Lond.), 1874, p. 601; *id.*, *ib.*, 1875, p. 582.*Collocalia terræreginæ* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Gould, Birds New Guinea, pt. 1 (Vol. IV., pl. 38), 1st Dec., 1875; Ramsay, Tab. List Austr. Birds, p. 2, 1888.*Collocalia francica* (pt.) Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 503, 1892; Hall, Key Birds Austr., p. 54, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 532, 1901; *id.*, Emu, Vol. VIII., p. 146, 1909; Broadbent, *ib.*, Vol. X., p. 234, 1910; North, Austr. Mus. Spec. Cat., No. 1, Vol. IV., p. 438, 1913; Campbell and Barnard, Emu, Vol. XVII., p. 18, 1917.*Salangana francica* Mathews, Handl. Birds Austral., p. 56, 1908.*Collocalia francica terræreginæ* Oberholser, Proc. Acad. Nat. Sci., Philad., 1906, p. 200; Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912; *id.*, List Birds Austr., p. 152, 1913.*Collocalia francica zoonava* Mathews, Bull. Brit. Orn. Club, Vol. XXXVI., p. 89, July 7, 1916: Johnston River, N.Q.

DISTRIBUTION. Queensland (Cardwell district and islands off the coast).

Adult male. Head, hind-neck and back dark soot-brown with bronze reflections; upper wing-coverts and secondary-quills glossy bottle-green slightly paler at the tips of some of the feathers and on the inner-webs of the latter; primary-quills darker and inclining to black; rump dusky grey; upper tail-coverts and tail dark bottle-green with a glossy appearance and slightly paler edges to the tips of the tail-feathers; base of lores whitish, the feathers above the eye rather paler at the tips and forming an obscure superciliary streak, the feathers in front of the eye black; throat and entire under-surface of body mouse-brown; under wing-coverts glossy bottle-green; under-surface of quills and lower aspect of tail dark brown with a glossy appearance and greenish reflections. Eyes dark brown; feet brownish-black; bill black. Total length 105 mm.; culmen 4, wing 110, tail 50, tarsus 8. Figured. Collected on the Barron River, North Queensland, on the 25th of June, 1911.

Adult female. Lighter on the under-surface. Wing 115.* Left-hand figure. The plate is lettered *Collocalia terræreginæ*.



Roland Green, del.

Witherby & Co.

$\frac{11}{12}$

COLLOCALIA TERRAEREGINAE.
(GREY-RUMPED SWIFTLET).

GREY-RUMPED SWIFTLET.

Nest. "Small, shallow, saucer-shaped; composed of some glutinous substance with a few feathers for a lining. Dimensions over all 2 to 3 inches by $\frac{1}{2}$ inch deep inside" (Campbell).

Eggs. "Clutch two (?), stout, oval in form; texture of shell fine; surface glossy; colour pure white; dimensions 17 mm. by 13." (*id.*)

Breeding-season. "September to December" (Banfield).

ALTHOUGH Macgillivray (the elder) collected this species at Dunk Island, Rockingham Bay, for some unexplained reason it was ignored by Gould until a quarter of a century afterwards, when Ramsay recorded it, writing: "This species inhabits the north-east coast range near Cardwell, Rockingham Bay, where it is tolerably plentiful, but very difficult to procure from its small size and swift flight. Small flocks may be seen flying to and fro over the cleared parts of the lower parts of the coast ranges, and frequently the same troop returns to the same open ground day after day; towards evening others may be found sweeping over the tops of the scrub and about the precipitous sides of the rocky ridges, where they doubtless breed. I found several young and immature plumaged birds, and none amongst those I obtained had the tail fully grown. I have never seen this species in any other part of Australia than near Rockingham Bay. It was observed in the neighbourhood of Cardwell during October, and when I left in April, 1874, it was still numerous there."

Campbell wrote: "When at Cardwell, Northern Queensland, August, 1885, my companions and I were greatly interested in the dusky little forms of this species of Swiftlet that hovered around our camp in dull weather, their presence usually predicting rain."

In the *Emu*, Vol. VIII., p. 146, 1909, Campbell described the nest and eggs from specimens forwarded him by Mr. E. J. Banfield from Dunk Island and gave Banfield's account, which I herewith reprint: "My discovery this day (18/11/08) of a colony of the Grey-rumped Swiftlet enables me to send by parcel post nests (2), eggs (3), and unhatched egg in formalin solution. On 17th September last (as I advised you) I found an incomplete nest in a gloomy cave on one of the highest points of the island, from which fragment you guessed the identity of the builder. A succession of adverse circumstances prevented further investigations until to-day. I was fearful that the breeding-season in the meantime might have passed: but, as the birds are among the permanent residents, I conclude that a sample of a complete nest might be procured, even though the rearing of families were over. On this occasion I went to a locality where I had often seen the Swifts darting among huge blocks of granite a few feet above highwater mark on the weather side of the island. They were plentiful and very active, but no nests were to be seen in the crevices I considered

THE BIRDS OF AUSTRALIA.

favourable. When, however, we began to explore a darksome cavern well hidden in the jungle, the excited fluttering of invisible birds revealed a hitherto well-kept secret. When our eyes became accustomed to the dimness we saw that the roof of the cave (which is fairly smooth and regular, with an inclination of about 30°) was studded with nests. I counted fifty-three, placed irregularly about the middle of the cave; none on the walls. Some nests were apparently not quite finished; twenty contained a single white egg each; none contained young. All were adherent to the roof by a semi-transparent white substance resembling isinglass, with which also the grass, tendrils, and bark composing the nests were consolidated. The vegetable material of which the first nest found (17th September) was made was quite green and the gluten moist and sticky. Those of to-day were hard-glued into solidity. After the first fright the birds became very quiet and confiding. A young one flew into my hand, and I detained it for a while without a struggle. Another tried to snoodle into the shirt-pocket of the black boy who accompanied me. Several brushed against our faces. The weather was quite cloudy, and what with the screen of foliage and the prevailing gloom of the cavern we could not always distinguish the nests. When the sun shone brightly they were all readily discernible, those with the single white egg looking very quaint. As they flitted in and out of the cavern the birds were as noiseless as butterflies, save when they wheeled to avoid each other. Those which were brooding, as they flitted over their nests and clung to the edges, uttered a peculiar note, hard to render into words. To my ears it seemed a blending of cheeping, clicking and chattering, yet metallic, and not very unlike the quick winding up of a clock. One bird flew to her nest a foot or so from my face, and clung to it. To test its timidity or otherwise I approached my face to within 2 inches of her, but she continued to scrutinise me at even these close quarters with charming assurance. Then I gently placed my hand over her. She struggled gently for a few seconds and then remained passive, her bright eyes glinting in the gloom. She was a dusky little creature, the primaries, the back of the head, neck, shoulders and tail being black, but when the wings are extended for flight the white down at the base of the tail is very conspicuous. After a few minutes I put her back in the nest and she clung to it, having no fear of me. I noticed that the beak was very small, the gape very large; the legs short and the toes slender. We remained in the cave for about half an hour, throughout which time the birds came and went, indifferent to our presence. In the interests of science, but to the violence of my own sentiments, I secured two specimens of the nests and four eggs for you. One egg was quite fresh; one had just germinated; the incubation of the third was well advanced; the fourth contained a live chick. It is interesting to note that, while many young birds were fluttering

GREY-RUMPED SWIFTLET.

about in the cave, though there were none in the nests, the eggs were in successive stages of incubation. The architecture of the nests, the way in which they were attached to the roof, and the attitude of the birds clinging to and brooding over them, resembled the picture in Richard Kerr's book—*Nature, Curious and Beautiful*—of the Swifts (*Collocalia*) which build the edible nests, which picture reproduces an exhibit in the Natural History Museum, London. True, the shape of the nest does not exactly correspond, though the scoop-like general appearance is preserved. The cave, which is invisible from the sea, is only about 30 feet above highwater mark, and the entrance which the birds favour is, strange to say, averse from the sea and much obscured by leafage. Altogether the incidents connected with this experience were very pleasant."

Later, Campbell apparently visited this colony himself, as in the *Emu*, Vol. XV., p. 253, 1916, he wrote: "Another indelible memory was a scene I witnessed only last year, when, with a genial companion, I visited a Swiftlet cave on a verdure-clad islet." In this note nothing new was added and no name or locality was given. In Vol. XVII. of the *Emu*, p. 18, 1917, Campbell and Barnard recorded *Collocalia francica* from the Cardwell district "seen hawking in numbers over the tree-tops both on the mainland and on Goold Island. There is no doubt that these fairy-like little creatures nest on several of the islands of the coast, and probably in recesses of the mainland mountains," adding: "A description of a visit by me is given in the *Emu*, Vol. XV., p. 253. I was under the guidance of our member, Mr. E. J. Banfield, of Dunk Island. A. J. C."

In the *Catalogue of the Birds in the British Museum*, Vol. XVI., 1892, Hartert lumped, though admitting that such action was conservative and carefully explaining the differences he observed among the specimens, writing as follows (p. 504): "This species has an enormous distribution, and forms several local races like its congener *C. fuciphaga*. The large birds from the Mergui Archipelago cannot be mistaken and may safely be regarded as a species, *C. innominata*, of Hume. The birds from Fiji, Samoa, Friendly Islands, Solomon Islands and Ternate are very dark and the back has very little gloss. The colour of the back in specimens from Australia (i.e., *C. terræreginæ* of Ramsay) is a little paler, but those from Mauritius and Bourbon are perfectly similar. Specimens from Mergui are paler beneath, and the feathers of the lower surface and of the light grey band across the rump have more obvious dark shaft-stripes. The specimens from South Andaman and Selangore (Klang) in the Malay Peninsula have the light band across the rump, which is dusky whitish or pale dusky grey in the typical forms, ill-defined, often so faint that they nearly approach *C. fuciphaga*. Most of the forms are so alike, and their geographical distribution is so wide and curious, that very few races can be kept separate.

THE BIRDS OF AUSTRALIA.

I cannot allow specific or even subspecific rank to either the birds from Australia or those from Mauritius, but may recognise as a subspecies the dark-rumped bird from the Andamans (i.e., *C. inexpectata* of Hume), and the paler bird from Mergui, so that we have two forms which are somewhat differentiated in their respective habitats. It may seem feasible to allow subspecific rank to the Pacific specimens on account of their generally darker upper-surface; but larger series show that this character is not constant, and therefore it is not advisable to keep them separate from *C. francica*."

Then was admitted

Collocalia francica.

"*Hab.* Fiji, Samoa, Friendly, and Solomon Islands, Ternate, New Guinea and Northern Australia, and Mauritius and Bourbon.

Subsp. α . *Collocalia inexpectata*.

"*Hab.* S. Andamans and southern half of the Malay Peninsula.

Subsp. β . *Collocalia merguiensis*.

"*Hab.* Southern portion of Tenasserim and islands of the Mergui Archipelago, from Tavoy Island southwards."

This peculiar scheme was accepted for some years, but in 1906 Oberholser monographed the genus in the *Proc. Acad. Nat. Sci. Philad.*, 1906, p. 197, etc., and admitted subspecies as we understand them to-day, but still conservatively, ranging thus:

Collocalia francica francica (Gmelin).

Mauritius.

Collocalia f. townsendi (Oberholser).

Tonga Islands.

Collocalia f. terræreginæ (Ramsay).

Queensland, New Guinea, Ternate, etc.

Collocalia f. spodiopygia (Pease).

Samoa Islands, Solomon Islands, Fiji Islands.

Collocalia f. inexpectata (Hume).

Andaman Islands, Malay Peninsula, etc.

Collocalia f. germaini (Oustalet).

Tenasserim to Philippine Islands.

Oberholser recognised the weak points in this scheme, e.g., lumping the Ternate birds (for which Salvadori had proposed *C. infuscata*) with the Queensland ones: Hartert had noted the light coloration of the latter, and had written of the former: "A typical specimen, kindly lent me by the author, does not differ from many examples of the dark Pacific form in the collection."

Another interesting item was his note about Forster's *H. peruviana*, which he determined as a member of this group, though it has not since been recorded

GREY-RUMPED SWIFTLET.

from Tahiti. Simultaneously Sharpe (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., 1906, p. 199) from an examination of Forster's drawings in the British Museum wrote: "Pl. 68.—*Hirundo peruviana* (Forst. *Descr. Anim.*, p. 240, 1844: Otaheitee).

This figure is intended to represent *Collocalia francica* (Gm.)."

Hartlaub provided *Herse forsteri* (*Journ. fur Ornith.*, 1854, p. 169) for Forster's species, so there is a name available should it be yet recovered.

Further, geographically it is impossible for a subspecies to occur on Samoa and Fiji with a different subspecies inhabiting the Tonga group.

The subspecies admitted would then read:

Zoonava francica francica (Gmelin).

Mauritius and Bourbon.

Zoonava francica inexpectata (Hume).

Andamans and Malay Peninsula.

Zoonava francica germaini (Oustalet).

Mergui Archipelago northwards to Philippines.

Zoonava francica infusata (Salvadori).

Ternate and other Moluccan Islands.

Zoonava francica subsp.

New Guinea.

Zoonava francica terræreginæ (Ramsay).

North Queensland.

Zoonava francica oberholseri subsp. n.

Fiji Islands and Solomon Islands.

Zoonava francica townsendi (Oberholser).

Tonga group.

Zoonava francica spodiopygia (Pease).

Samoa Islands.

Zoonava francica forsteri (Hartlaub).

Tahiti. ? Extinct.

This tentative classification shows improvement on the preceding, but will still further be emended when more birds are procured.

The Fijian birds are noticeably smaller and paler both above and below than the Samoan birds, while apparently darker than the Tonga form. There is a fine series (over twenty) in the British Museum from Fiji, collected by Layard and others, while there are specimens enough to show the variation from the other places. There is only one immature skin from the Solomons, so that the status of the form living there cannot be proven, but it is probably a distinct subspecies.

In the *Bull. Brit. Orn. Club*, Vol. XXXVI., p. 89, July 7, 1916, I separated

THE BIRDS OF AUSTRALIA.

“*Collocalia francica zoonava*. Differs from *C. f. terræreginæ* (Ramsay) in being much darker on the under-surface, and in having the light band on the rump brownish-white. Wing, ♂, 110 mm. Johnston River, North Queensland.” I have not maintained this form, as it may be that the characters are those of the first plumage, and there is no series enabling the discrimination of the young, these having the adult feathering from the nest with probably a slightly darker shade and a shorter wing.

A painting of this bird sent to Gould (and now in my possession) has: “This Swallow was also collected by Mr. Broadbent, on the coast range of Rockingham Bay. First seen at Dalrymple’s Gap, they appeared to come from the north and return again in the evening. In the morning before rain this bird assembled in large flocks and just skimmed over the ground with great rapidity. They were all leaving about the latter part of June.”

Order MICROPODIFORMES.

Family MICROPODIDÆ.

No. 399.

ZOONAVA FUCIPHAGA.

UNIFORM SWIFTLET.

(PLATE 346.)*

HIRUNDO FUCIPHAGA Thunberg, Kongl. Vetensk. Akad. Handl. (Stockh.), Vol. XXXIII., p. 153, pl. iv., 1812 : "Java in montium."

Collocalia francica yorki Mathews, Bull. Brit. Orn. Club, Vol. XXXVI., p. 77, April 27, 1916 : Cape York, North Australia.

Collocalia fuciphaga yorki Mathews, *ib.*, p. 92 ; *id.*, Emu, Vol. XVI., p. 182, 1917.

DISTRIBUTION. Cape York, North Australia.

Adult male. General colour above sooty-black with a steel metallic sheen on the top of the head and a bronze-green gloss on the back, wings, and tail ; inner-webs of flight-quills smoke-brown ; the feathers on the rump more or less white at the base ; lores and feathers in front of the eye white at the base ; under-surface smoke-brown inclining to grey on the throat and more or less grey at the base of the under tail-coverts ; under wing-coverts sooty-black ; under-surface of wings and lower aspect of tail glossy dark brown. Eyes, feet and bill black. Total length 120 mm. ; culmen 4, wing 120, tail 55, tarsus 9. Figured. Collected at Cape York on the 10th of September, 1913.

Adult female. Similar to the adult male.

Nesting. Details (as regards Australia) unknown.

WITH little life-history this species has a large scientific literature which is too immense to be adduced here, where only a short résumé can be given.

When Hartert monographed the genus in the Sixteenth Volume of the *Catalogue of the Birds in the British Museum* in 1892, he wrote, p. 497 : "So many species of *Collocalia* have been distinguished and named by various ornithologists and subsequently reunited by others, that it would be most difficult, and in some cases almost impossible, to determine the species from the literature ; but the materials in the British Museum, supplemented by the specimens lent to me by several friends, though still quite imperfect from certain localities, have enabled me, I believe, to throw a little light upon this group. Ornithologists are no doubt aware of the fact that *Collocaliæ* are

* Right-hand figure. The plate is lettered *Collocalia terræreginæ*

THE BIRDS OF AUSTRALIA.

resident birds, often confined to a small tract of country, where they find suitable caves for breeding, and may therefore readily form local races; on the other hand, their power of flight is so great that the occurrence of any species far from their regular abode is by no means astonishing."

Two species were there admitted as Australian: *Collocalia francica*, of which Ramsay's *Cypselus terræreginæ* was considered a synonym; and *Collocalia esculenta*, on the strength of three skins from "Cape York, Austr. (J. T. Cockerill)." I will deal with the latter item hereafter.

The present species was not recorded from Australia until last year, when I recognised a bird collected by Robin Kemp at Cape York as referable to this species. I have written a short account of this species in the *Emu*, Vol. XVI., p. 181, 1917, and here give fuller details of the systematic subdivision of the species. Thus, in the *Catalogue of the Birds in the British Museum*, Vol. XVI., p. 500, 1892, Hartert wrote: "This bird has a very wide range and forms several local races. There is no difference between the birds from the Malay Archipelago and the so-called *C. unicolor* from the Nilgherries. The birds from the Eastern Himalayas and Manipur differ so much from those of the Nilgherries that they are considered by several ornithologists to constitute a distinct species; but, after having compared large series from all localities, it is evident that intermediate forms occur, and therefore it is not possible to allow it more than subspecific rank. The birds from Negros in the Philippines are very black and glossy above and average a little shorter, so that they seem to constitute a good race, but the bird from the Astrolabe Range is exactly similar. The specimens from Celebes have generally rather short wings, but this character is not quite constant and does not seem sufficiently obvious to justify the formation of even a distinct race." Such was the view taken by a splitter twenty-five years ago.

In 1906 Oberholser revised the group and allowed three subspecies and a different species. Six years afterwards he returned to the subject and in *Proc. U.S. Nat. Mus.*, Vol. XLII., pp. 11-20, March 6, 1912, extended the number of forms to ten, ranking the different species above named as a subspecies only. He observed: "The range of *Collocalia fuciphaga*, as a species, is extensive. It occurs west to the Himalaya Mountains at about 76° east longitude; north to Central China, the Philippine Islands, Mariana Islands, and the Caroline Islands; east to the Duke of York Island (Union group) and the Tonga Islands; south to the Loyalty Islands, New Guinea, Java, Nias and the Seychelles Islands. It seems to be a permanent resident throughout its range. Although the differences between the several races are apparently slight, they are reasonably constant, for individual variation is not great. As is the case with the other species of the genus, there is practically no sexual difference

UNIFORM SWIFTLET.

in either size or colour, for which reason no distinction is necessary in colour comparisons or measurement averages."

Oberholser's ten subspecies are—

Collocalia fuciphaga fuciphaga (Thunberg).

Java.

Collocalia fuciphaga amechana (Oberholser).

Anamba Islands.

Collocalia fuciphaga elaphra (Oberholser).

Seychelles Islands.

Collocalia fuciphaga brevirostris (McClelland).

Assam.

Collocalia fuciphaga capnitis (Thayer and Bangs).

Hupeh, Central China.

Collocalia fuciphaga vestita (Lesson).

Sumatra.

Collocalia fuciphaga aerophila (Oberholser).

Nias Island, Sumatra.

Collocalia fuciphaga mearnsi (Oberholser).

Luzon, Philippine Islands.

Collocalia fuciphaga vanikorensis (Quoy and Gaimard).

Vanikoro Island, Santa Cruz group.

Collocalia fuciphaga tachyptera (Oberholser).

Guam, Mariana group.

It would have been anticipated that here was splitting enough, but Stresemann two years after made alterations and additions to this survey. In the *Verhandl. Ornith. Gesellsch.*, Bayern, Bd. XII., Heft. 1, pp. 1-12, May 15, 1914, he made the following emendations. Two species were determined as having been confused by Oberholser and these he concluded should bear the names *Collocalia fuciphaga* and *C. vestita*. Oberholser's *vestita*, *amechana*, *aerophila*, *capnitis*, *brevirostris* and *elaphra* are referred to the last named as subspecies, yet still ten subspecies of *C. fuciphaga* were admitted. These may be also summarised:

Collocalia fuciphaga fuciphaga (Thunberg).

Sumatra, Java, Kangean.

Collocalia fuciphaga subsp.

Natura, Borneo, Palawan.

Collocalia fuciphaga micans (Stresemann).

Sumba, Savu, Timor, Celebes.

THE BIRDS OF AUSTRALIA.

Collocalia fuciphaga moluccarum (Stresemann).

Kei and Sud-est Islands, Moluccas.

Collocalia fuciphaga hirundinacea (Stresemann).

West New Guinea.

Collocalia fuciphaga vanikorensis (Quoy and Gaimard).

Louisiade Islands, D'Entrecasteaux Islands,
Santa Cruz, New Hebrides.

Collocalia fuciphaga inquieta (Kittlitz).

Caroline Islands.

Collocalia fuciphaga tachyptera (Oberholser).

Marianne Islands.

Collocalia fuciphaga amelis (Oberholser).

Philippine Islands.

Collocalia fuciphaga unicolor (Jerdon).

Ceylon, West Malayas, West Burmah.

It might have been concluded that the limit in the number of subspecies had here been reached, but apparently there is no limit in this connection, as the following year Ogilvie-Grant dealing with New Guinea birds in the Jubilee Supplement, No. 2, to the *Ibis* wrote, p. 191: "Mr. Oberholser [cf. *P.U.S. Nat. Mus.*, 42, pp. 11-20 (1912)] has reviewed this species and recognises a number of subspecies. Later Mr. Stresemann has further added to the number. Some of the races described by these authors seem to be tolerably distinct, but it is certain that too many have been recognised. The *C. fuciphaga* group is a very difficult one, and even with the resources of the British Museum and the Tring Museum at one's disposal it is difficult to decide as to the validity of some of the names; it will thus be easily understood that the founding of new races of the *C. fuciphaga* group on single specimens, such as the type of *C. aerophila*, Oberholser from Nias Island, should not be lightly undertaken. I am, however, obliged to describe a new highland form from the Snow Mountains, of which we possess but two specimens."

Then was admitted *Collocalia fuciphaga vanikorensis* (Q. and G.) for birds from the Setakwa River, the type locality of Stresemann's *C. f. hirundinacea*, while *C. hirundinacea*, raised to specific rank, was used for birds from the Mimika River, a comment reading: "Mr. Stresemann states that the tarsus is unfeathered in this species; but this is not really the case." This suggests that once more there is confusion in the discrimination of the species and subspecies of these birds.

It is probable that this bird is also a resident in Australia as the species of this group are resident birds. At the present time it is only known from one specimen secured at Cape York, Queensland, by Mr. Robin Kemp and

UNIFORM SWIFTLET.

which I at first associated with the preceding species. Later I saw the differences, but minimised them as subspecific only, writing: "Differs from *C. f(rancica) terræreginæ* (Ramsay) in lacking the whitish rump, in being darker below, and in having the bill bigger and broader." For the purpose of this work it was necessary to closely criticise the genus when I found the slight characters noticed were specific and that this was an addition to the Australian List. I contributed an item to the *Emu*, pointing out the peculiarities of the form and the complexity of its nomination. I there gave details showing that these birds are very local, and consequently that the Australian killed specimen was probably representative of a subspecies. Nevertheless birds killed in South New Guinea might belong to this race, but no name had been given to these. Hence my subspecific name would still be valid. The name used by recorders of the species from New Guinea was *Collocalia fuciphaga vanikorensis* based on *Hirundo vanikorensis* Quoy and Gaimard, given to a bird from the Island of Vanikoro, Santa Cruz group. Geographically this name was untenable, as no specimens were available from the type locality and the description was too meagre to determine the subspecies. Thus, Ogilvie-Grant, by no means a splitter, recognised *three* allied forms from South-west New Guinea, while two forms, at least, inhabit South-east New Guinea, and these differ from birds from the New Hebrides, which locality is nearer to the Santa Cruz group. With such facts the only scientific course is the recognition of the exact name and that happens in this case to be my own.

Some workers have minimised the feathering of the tarsus, a feature of some species, apparently congeneric with the present one. However, it seems much more important in this group than would be considered at first sight, and consequently I restrict Oberholser's name *Aerodramus* in a generic sense, and utilise *Zoonava* also generically.

GENUS—COLLOCALIA.

COLLOCALIA Gray, List Genera Birds, 1840, p. 8 .. Type *C. esculenta*.

Also spelt—

Colocalia Gray, Cat. Gen. Subgen. Birds, p. 12, 1855.

Callocalia Broadbent, Emu. Vol. X., p. 234, 1910.

Salangana Lesson, Echo du Monde Savant, 10th year,

No. 6, col. 134, July 20, 1843 Type *C. esculenta*.

Hemiprocne Riemann, "Zoolog-technol. Leitfaden für
Realschulen Gymnasien, 1838, p. 34" (Cf. Ober-

holser, Proc. Biol. Soc., Wash., Vol. XIX., 1906, p. 67) Type *C. esculenta*.

Not—

Hemiprocne Nitzsch, Observ. Av. Arter. Carot. Com., 1829, p. 15.

I HAVE noted the differential characters of this genus in connection with the preceding genus.

The diagnostic characters of this form, in case it should occur in Australia are very simple: it is smaller than the preceding forms and of very different coloration, being blue-black above, with a strong gloss: underparts, throat and breast dark grey, the feathers with white edges: the abdomen all white: the tail with white markings on the inner-webs of the feathers towards the base.

COLLOCALIA ESCULENTA.

HIRUNDO ESCULENTA, Linné, Syst. Nat., ed X., p. 191, 1758: China (errore).

Collocalia esculenta (pt.) Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 509, 1892;

Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 533, 1901; Mathews, Nov. Zool., Vol. XVIII., p. 291, 1912; *id.*, List Birds Austr., p. 152, 1913.

Salangana esculenta Mathews, Handl. Birds Austral., p. 56, 1908.

THE only record of this species from Australia that I have traced consists of three specimens in the British Museum from "Cape York, North Australia," collected by J. T. Cockerell. These were catalogued in the *British Museum Catalogue* and thence crept into the Australian List. As, however, no other specimens have been yet procured, and the falsity of the "Cockerell" localities is now admitted, this species must be transferred to a suspense List. As it occurs on the Aru Islands, whence the Cockerell specimens in all probability came, it is possible it may occur on the comparatively unexplored northern coasts of Australia.

GENUS—HIRUNDAPUS.

HIRUNDAPUS Hodgson, Journ. As. Soc. Bengal, Vol. V.,
p. 780, 1837 Type *H. nudipes*.

Also spelt—
Hirundinapus Selater, Proc. Zool. Soc. (Lond.), 1865, p. 607.

LARGEST Micropodine birds with small bills, very long wings, short tails with needle-points, and small legs and feet.

The bill is very small and triangular, a prominent culmen ridge being present, though it cannot be said to be keeled: the tip is decurved but not sharply hooked. The nostrils are long ovals, placed alongside the culmen ridge and parallel to it, with a membrane extending to the lateral edge of the culmen. The tip of the under mandible is short and spoon-shaped, fitting into the tip of the upper mandible.

The wing is very long, the feathers very narrow and pointed. The first primary is longest, the rest regularly decreasing, the secondaries very short, exceeded by the last primary.

The tail is very short and rounded, composed of ten feathers which are broad to the tips whence the shafts extend as short, thin needle-points, the shafts hard but not very powerful. The tail is not much more than one-fourth the length of the wing.

The legs and feet are small. The tarsus is not feathered, and there are neither scutes nor reticulate scales to be observed on the skin-like covering: it is longer than the middle toe. The toes also present a skin-like cover, scutes being rarely observed on the last joint only. The inner and outer toes subequal and not much exceeded by the middle toe: the hind toe long and directed backward, but capable of movement. The claws are all long, very convex and sharp pointed.

The phalanges in the outer and middle toes are said to be normal in number, whereas in the true Swifts they are recorded as reduced to three. How far these statements are true of all the species referred to the different groups is not given and will be commented upon later.

When Hartert monographed the Swifts, in the *Catalogue of the Birds in the British Museum*, Vol. XVI., 1892, he admitted p. 470, a genus *Chætura*, citing as synonyms *Acanthylis* Boie, *Hirundapus* Hodgson, *Pallene* Lesson, *Hemiprocne* Nitzsch, 1840 and *Rhaphidura* Oates. This association was

THE BIRDS OF AUSTRALIA.

characterised thus: "Shafts of rectrices very stiff, with perceptibly prominent spinous points." He stated: "I cannot recognise the genus *Hemiprocne*, because the form of the tail alone cannot be regarded as being sufficient to separate genera in the *Cypselidæ*, as the species of the genus *Micropus* clearly show."

By one of those peculiar coincidences that occur in scientific work, this assembly remained unquestioned until quite recently, though it was obviously based upon a very superficial feature, and one apparently of little value. The discovery of the use of *Hemiprocne* earlier than 1840 incited American ornithologists, and Oberholser recorded (*Proc. Biol. Soc.*, Wash., p. 68, May, 1906): "Doctor Hartert in his most recent review of the Swifts, placed *Hemiprocne* as a synonym under *Chætura*, claiming that the shape of the tail was not sufficient for its recognition as a different genus. However valid such a claim may be—and it seems not to be so in this case—there can now be no doubt of the propriety of generically segregating the group of Swifts of which *Hirundo zonaris* Shaw may be considered the representative, because aside from its emarginate instead of square or rounded tail, it differs remarkably from *Chætura* in the arrangement of the deep plantar tendons."

Nevertheless it escaped the notice of British ornithologists that superficially the large Needle-tailed Swift, that has occurred twice in their limits and hence is considered a "British Bird," was separable from the small American species, and they continued the misuse of *Chætura*.

There are two very distinct groups, differentiated by size: large birds, including the Australian *caudacuta*; and small ones, which are not represented in Australia in any group. It is necessary to discuss the whole series classed by Hartert under *Chætura* to define the name to be used for the large Australian bird. Since I drew up my notes, I find that Ridgway in the *Bulletin U.S. Nat. Mus.*, No. 50, covering pt. v. of the *Birds of North and Middle America* has given a Key to these birds, but as usual with Keys it is deficient in some way. Dealing with American birds especially, extra-limital genera are sometimes diagnosed, but not so much study being given to the latter the details are not perfect. Thus criticism of these extra-limital groupings is inevitable, and it does not detract from Ridgway's great work if these be not found faultless. Thus, he admitted a subfamily *Chæturinæ* and one of the items of his diagnosis reads: "Tarsi and toes naked": just previously he had referred to the oriental genus *Collocalia* as belonging to the subfamily *Chæturinæ*. The "genus" *Collocalia* as accepted by Ridgway, however, included species with "feathered" tarsi, an item overlooked on account of the non-inclusion of the said genus in the North American fauna.

Ridgway admitted four genera where Hartert accepted one only: thus

HIRUNDAPUS.

Hirundapus (including *Pallene*), *Mearnsia* nov. for *Chætura picina* Tweeddale, *Streptoprocne* and *Chætura*, interposing between *Streptoprocne* and *Chætura* the genera *Nephæcetes* and *Cypseloides*: the latter being lumped as *Cypseloides* by Hartert and ranged as a distinct genus following *Chætura*.

He grouped *Hirundapus* and *Mearnsia* as having the tarsus not longer than the middle toe and claw, while the others had. *Chætura* was characterised by having the hallux relatively much smaller than it was in the other genera.

Such a grouping was little improvement upon that given in the *Catalogue of the Birds in the British Museum*, but obviously there was necessity of rearrangement.

I would divide the whole lot into two groups, large and small species. The large species all agree in size generally, in the proportions of wings, tail and feet and in coloration. Superficially, however, three divisions can be made by means of the tail and these might be considered of little value, were it not for the fact that anatomical differences have been observed showing that the superficial items are confirmed by internal distinctions. Consequently these can be regarded as of generic value, a view taken up by the American ornithologists, Lucas, Oberholser and Ridgway, and here accepted.

I have diagnosed the *Hirundapus* group and note that the birds like *zonaris* Shaw have longer tails, which are emarginate, with the needle-points scarcely extending beyond the tips. This is the series named *Streptoprocne* by Oberholser, and admitted as of generic value on account of anatomical details. Ridgway synonymised *gigantea* Temm. with *Hirundapus*, because he did not examine it critically, as superficially its tail shows more character than that of the American birds. It is longer, more rounded than that of *Hirundapus*, the feathers narrower and the needle-points are stiff, long continuations of the strong quills. The name quoted in the *Catalogue of the Birds in the British Museum* is *Pallene* Lesson, 1837, but that name was preoccupied. I had anticipated proposing a new name, but Richmond in his third list of Generic Terms of Birds has drawn attention to *Pallenia* Bonaparte, 1857. He accepts this as a valid name for *Pallene* Lesson preoccupied, following Gray's usage in 1869. This seems a sound conclusion, and is therefore here recognised.

This would dispose of the large forms, but the smaller ones form an incongruous assemblage, study of which leads to the conclusion that the needle-tail is of little systematic value, having independently evolved, and that the birds with such tails are not closely related. The first glance shows several colour groups, and the value of these becomes evident when it is remembered that in the large birds we are confronted with three genera, though the coloration is practically the same throughout. Again *Cypseloides* of Hartert is divided into two genera by Ridgway, but the birds are again of very similar coloration, an argument

THE BIRDS OF AUSTRALIA.

once more that colour is older than structural features. I will deal particularly with this item later. As many of the smaller species are American, these may be classed in *Chætura*, proposed for an American form, and with which they generally agree in coloration.

Pelasgia, *Acanthylis* and *Acanthura* are also based on American birds and the types of all these are superficially alike. They have not yet been generically separated by American ornithologists, but certainly will be later, as anatomical differences are already on record in this connection.

The extra-American species are varied in coloration and of peculiar distribution, a peculiar series being developed in West Africa. At least three different Spine-tailed groups can be discriminated by means of coloration and the colour differences are confirmed by tail characters. These may be noted as typified by *Chætura ussheri* Sharpe, *Chætura cassini* Sclater and *Chætura sabini* Gray.

The first-named, *C. ussheri*, has a smoky-brown coloration with a white rump and under tail-coverts and striped throat. The first primary of the wing is longest, the feet are comparatively strong, while the tail is also comparatively long, being more than one-fourth the length of the wing, with the spines long and stiff. For this group I propose the name

TELACANTHURA

which may be used subgenerically or generically, but I cannot understand how it can be used in the former manner, as there does not seem to be any close relation known. Type *Telacanthura ussheri* (Sharpe).

The second, *C. cassini*, differs entirely in coloration, being black above with a smoky throat, white upper tail-coverts and abdomen white, the shafts of the feathers dark. Structurally, it has very long wings with a very short tail with stiff short spines. The tail is less than one-fifth the length of the wings. No close relationship between this and the preceding group is apparent, and I here introduce for it the new name

NEAFRAPUS

which may, as above, be considered of generic value. Type *Neafrapus cassini* (Sclater).

The third, *C. sabini*, is blue-black above, the upper tail-coverts white and long, the tail long and square with short projecting spines: the under-surface has the throat dark, the abdomen light: the feet are stout for the size of the bird in this group. It does not correlate with the preceding, as the tail is more than one-third the length of the wing. I therefore propose the new name

ALTERAPUS

with type *Alterapus sabini* (Gray).

Two species of small *Chætura* are known from India, and these are

HIRUNDAPUS.

remarkably distinct from each other as well as from other forms. Oates proposed the genus *Rhaphidura* for one, and fearing criticism included the other. The non-recognition of his genus shows his fears were well grounded, as it is a very distinct and valid genus and would only be lumped by careless or prejudiced workers. The type of his genus, *Rhaphidura*, was *Acanthylis leucopygialis* Blyth, and this is a small bird, of blue-black coloration, with light upper tail-coverts, which are so long as almost to hide the tail, which is short with the spines proportionately very long, while the feet are small and weak.

The other species associated with it was named *Acanthylis sylvatica* by Tickell, and is the smallest of the group: the wings are not so long as in the preceding, while the tail is long and rounded, with the projecting spines very short, and the feet minute. The coloration is very different from that of the preceding, especially the under-surface. I introduce for it the new name

INDICAPUS.

Type *Indicapus sylvaticus* (Tickell).

The last form I will discriminate is perhaps more interesting than any of the others, as it suggests the keynote to the solution of the evolution of the Spine-tailed Swifts. This is *Chætura grandidieri* Schlegel, which lives at Madagascar. Superficially in every detail, save its tail, it is a "*Collocalia*" of the *Zoonava* group. It absolutely agrees in detail as to coloration and, moreover, has the nostrils placed as in the "*Collocalia*" group, not as in the "*Chætura*" typical series. Further, the second primary appears to be longest, which is a character of the former, but not of the latter. The superficial resemblance is so great that it possesses a MS. name showing its determination as a "*Collocalia*." A natural classification will almost certainly prove that is its nearest relationship and that the evolution of the Spine-tail is more recent than the acquisition of plumage coloration. To initiate this quest, I propose to give it the new generic name

ZOONAVENA

with type *Zoonavena grandidieri* (Schlegel).

The tail-feathers are stiff, but the needle-points are quite minute.

As noted above, Ridgway introduced the new genus *Mearnsia* for *Chætura picina* Tweeddale. This species from the Philippine Islands stands alone in coloration and form: the wings being exceedingly long and the tail exceedingly short.

The peculiar distribution of these Needle-tails may be here appended. *Hirundapus* and *Pallenia* are Asiatic, while *Streptoprocne* is American. These constitute the large series which agree generally in coloration and size.

Chætura restricted is American, and though the species are somewhat

THE BIRDS OF AUSTRALIA.

similar in coloration, more than one genus may be found to be confused under the name.

The West African birds associated on account of their spine tails appear to represent three different genera, which I have called *Telacanthura*, *Neafrapus* and *Alterapus*.

One species from Madagascar, which seems to be a spine-tailed derivative of *Zoonava*, a *Collocaline* bird, I have differentiated as *Zoonavena*.

Two Indo-Malay species are of different origin, and these are separated as *Rhaphidura* and *Indicapus*.

One species from the Philippine Islands has been differentiated by Ridgway as *Mearnsia*.

This leaves *Chætura novæguineæ* D'Albertis and Salvadori, from the Fly River, New Guinea, as representative of another genus, which is indicated by its description by Hartert as an extraordinary species.

In coloration it is nearest *sylvatica*, but is larger, with no white rump, the wing longer with the second primary longest, the tail short and slightly forked with minute needle-tips, the feet comparatively large and strong. It is quite unlike any other group, and I therefore propose for it the new generic name

PAPUANAPUS.

The most cursory glance over this discontinuous distribution, with the two peculiar features of the development of several groups in West Africa and probably America, strongly supports my suggestion that we cannot utilise the spine-tails as an absolute generic feature and that it shows convergence of evolution in an impressive way. I will now give, perhaps, the most convincing factor in favour of my view. This is the series of birds classed by Hartert as a genus *Cypseloides* with the diagnosis: "Shafts of rectrices not so stiff, and without perceptibly prominent spinous points." Additional is written: "This genus is closely allied to *Chætura*, but may be recognised by the characters given above. The plumage is softer than in true *Chætura*; the shafts of the rectrices are not so stiff. *C. rutilus* and *C. brunneitorques* are better placed with *Cypseloides*, although the spines are a little visible." This intermediate series are American birds. Ridgway has accepted two genera, *Nephæcetes* [=Nephocætes] and *Cypseloides*, on account of the difference in the stiffness of the tail. Still, here there are certainly four groups, as under *Cypseloides* Ridgway has accepted three groups superficially as different as *Nephæcetes* [=Nephocætes] is from *Cypseloides*. Thus *Cypselus senex* is a much larger bird and differs in proportions, and its close relationship with *fumigata* the cited type of *Cypseloides* is problematical. There is a genus name, *Aerornis* Bertoni, 1901, which can be utilised.

The two species with rufous collared males and spine-tipped tails differ

HIRUNDAPUS.

appreciably from *Cypseloides* in the length of the tail, and I separate these as a new genus

CHÆTURELLUS,

naming *Hirundo rutula* Vieillot as type *Chæturellus rutilus*. Previous to Hartert's reference of these to *Cypseloides* they had been classed in *Chætura*, and this indicates the nature of the tail. It is quite intermediate between the two genera, while the coloration is unique.

The name *Cypseloides* appears to be in a somewhat precarious position, as it seems to have been proposed as a substitute for "*Hemiprocne sensu strictu*" and to have been dubiously put forward by Sclater in 1865. Streubel in the same place (*Isis*, 1848, col. 366) wrote: "*Senes seu Hemiprocne proprie dictu*," but I have not noted *Senes* cited as a generic name. I do not propose to discuss this item, but point out that there is an alternative, *Acanthylops* Gray, 1869, which has for type *H. fumigata* Streubel, herewith designated. Richmond (*Proc. U.S. Nat. Mus.*, Vol. LIII., p. 574, 1917) has stated that "*Achantylops* Bonaparte 1857," is a nomen nudum.

There is, therefore, in America a series of Spine-tailed Swifts and also a series of semi-Spine-tails: the latter show very clearly the evolution of the spine-tail and, moreover, indicate in no uncertain manner its appearance in independent groups. The whole of the *Micropodidæ* have structural features as regards the external appearance of the bill, the formation of the wing and the structure of the feet of a generalised nature. In the first named the position of the nostrils may prove a good character when the skull is examined, as it suggests different structure internally. The wing shows little variation, the length of the primaries varying in proportion to the secondaries, while sometimes the first, sometimes the second primary is longest. The feet are small, and the differences consist in the position of the toes and the feathering or absence of feathers on the tarsus. Anatomical investigation has proved that these superficial features are correlated with important internal differences.

The tail formation which is here used seems quite as important a feature as the others, when it is criticised from its nature, not its apparent form only.

This review was undertaken to determine the validity of the genus *Hirundapus*, and as this is the earliest name given to the large Spine-tailed Swifts and, moreover, introduced for a bird certainly congeneric with the Australian form, it is indisputable. From it, however, must be divorced the diverse species classed by Hartert under the name *Chætura* and these must be separated into many genera or subgenera.

Thus, to recapitulate, the *Hirundapine* forms are divisible into three genera, *Hirundapus*, *Pallenia* and *Streptoprocne*. The smaller species into many genera, *Chætura* for the American forms, *Telacanthura*, *Neafrapus* and *Alterapus*

THE BIRDS OF AUSTRALIA.

for West African birds, *Rhaphidura* and *Indicapus* for Indo-Malay species, with *Zoonavena* for a Madagascar bird, *Mearnsia* for a Philippine Islands species, and *Papuanapus* for the Papuan endemism. The discontinuous distribution confirms the generic separation of these forms as the coloration suggests, indicating diverse origin and convergence of tail characters. I find support in a series of semi-Spine-tailed birds, all from America, which is divisible into four groups: *Cypseloides* (or *Acanthylops*), *Nephocætes*, *Aerornis* and *Chæturellus*, proving convergence, without the difference of locality as an assistance for separation.



Roland Green, del.

Witherby & Co

$\frac{5}{8}$
CHAETURA CAUDACUTA.
(SPINE-TAILED SWIFT).

HIRUNDAPUS CAUDACUTUS.

SPINE-TAILED SWIFT.

(PLATE 347.)*

Hirundo caudacuta Latham, Index Ornith., Suppl., p. lvii., 1801 : New South Wales.

Needle-tailed S(wallow) Latham, Gen. Synops. Birds, Suppl. II., p. 259, 1801.

Hirundo caudacuta Latham, Index Ornith., Suppl., p. lvii., 1801 ; Stephens in Shaw's Gen. Zool., Vol. X., p. 133, 1817.*Hirundo fusca* Stephens in Shaw's Gen. Zool., Vol. X., p. 133, 1817 : New South Wales.*Chaetura australis* Stephens in Shaw's Gen. Zool., Vol. XIII., pt. II., p. 76, 1826 : New South Wales.*Chaetura fusca* Stephens, *ib.**Hirundo ciris* Pallas, Zoogr. Rosso-Asiat., Vol. I., p. 541, 1827 : Siberia.*Chaetura macroptera* Swainson, Zool. Illus., Ser. II., pl. 42, 1829 : New South Wales.*Acanthylis* caudacuta* Gould, Birds Austr., pt. IX. (Vol. II., pl. 10), 1842 ; Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 194, 1843 ; Legge, Proc. Roy. Soc. Tasm., 1886, p. 238, 1887.*Pallene caudacuta* Boie, Isis, 1844, col. 168.*Pallene macroptera*, Boie, *ib.**Chaetura caudacuta*, Cabanis and Heine., Mus. Hein, Vol. III., p. 83, 1860 ; Gould, Handb.

Birds Austr., Vol. I., p. 103, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 581

(N.Q.) ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878 ; *id.*, Tab. List Austr.

Birds, p. 2, 1888 ; Hartert, Cat. Birds Brit. Mus., Vol. XIX., p. 472, 1892 ; Hall, Key

Birds Austr., p. 54, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 531,

1901 ; Dove, Emu, Vol. II., p. 21, 1902 (Tas.) ; Littler, *ib.*, p. 171, 1903 (Tas.) ;Berney, *ib.*, Vol. IV., p. 45, 1904 (N.Q.) ; Dove, *ib.*, Vol. V., p. 32, 1905 (Tas.) ;Berney, *ib.*, Vol. VI., p. 42, 1906 (N.Q.) ; Mathews, Handl. Birds Austral., p. 56,1908 ; Ford, Emu, Vol. VIII., p. 27, 1908 (Vic.) ; Dove, *ib.*, p. 39 (Tas.) ; Littler,*ib.*, p. 94 ; Vol. X., p. 51, 1910 (Tas.) ; *id.*, Handb. Birds Tasm., p. 76, 1910 ;Broadbent, Emu, Vol. X., p. 234, 1910 (N.Q.) ; G. F. Hill, *ib.*, p. 272,1911 (N.W.A.) ; Barnard, *ib.*, Vol. XI., p. 24, 1911 (N.Q.) ; Stone, *ib.*, Vol. XII.,p. 117, 1912 (Vic.) ; Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.) ; Cheney, *ib.*, p. 207,1915 (Vic.) ; Dove, *ib.*, p. 218 ; Vol. XVI., p. 61, 1916 (Tas.).* The plate is lettered *Chaetura caudacuta*.† Also spelt *Acanthyllis*.

THE BIRDS OF AUSTRALIA.

Acanthylis ciris Bonaparte, Consp. Gen. Av., Vol. I., p. 65, 1850.

Chaetura ciris Gray, Handl. Gen. Sp. Birds, Vol. I., p. 67, 1869.

Hirundinapus caudacutus Salvadori, Ann. Mus. Civ. Genov., Vol. XII., p. 320, 1878.

Chaetura caudacuta caudacuta Mathews, Nov. Zool., Vol. XVIII., p. 292, 1912; *id.*, List Birds Austr., p. 153, 1913.

DISTRIBUTION. Queensland; New South Wales; Victoria; Tasmania.

(Northern Territory: Barnard). (North-west Australia: G. F. Hill). (Accidental to Europe). Extra-limital, breeding in Siberia, Japan or China.

Adult male. Crown of head, hind-neck, wings, sides of rump, and tail bottle-green with a bluish tinge; mantle and back smoke-brown, much paler in the middle of the latter; inner-webs of the innermost secondaries white; inner-webs of primary and secondary quills brown; base of fore-head pale drab-grey; a large triangular throat-patch, including the chin, white as are also the lower flanks and under tail-coverts; breast, abdomen, axillaries, and sides of the body dark soot-brown; under wing-coverts bottle-green; the greater series and under-surface of quills glistening brown; lower aspect of tail shining bottle-green. Eyes hazel; feet flesh; bill black. Total length 225 mm.; culmen 7, wing 209, tail 54, tarsus 19. Figured. Collected at Narrabeen, New South Wales, in February, 1892.

Adult female. Similar to the adult male.

Nest. Not described.

Eggs. Clutch two, white 30-5 mm. by 19.

Breeding-season. June.

THE Spine-tail was one of the numerous birds described by Latham from the drawings made by Watling, which are now preserved in the British Museum (Natural History). The description was not at first recognised and Stephens renamed it *Hirundo fusca*, and then, when later he proposed the genus *Chaetura*, he added another name, *Chaetura australis*. Shortly afterward was published Pallas' *Zoogr. Rosso-Asiat.*, a work which had been prepared and printed many years previously, and therein the bird was described and named from its breeding locality. A couple of years afterward Swainson renamed it, when he published an excellent figure of the species.

In 1843, when Gray examined the "Watling" drawings, he recognised Latham's species, and since that time the name has been used without any complication.

Watling's note, the earliest field note on the species, reads: "This bird, about half the natural size, seems to possess, in a great measure, the qualities of a Swallow. Its motions are amazingly quick, eager of its prey, which it seizes with the rapidity of lightning. Its favourite food is a large locust, which at this season is plentiful. It is strongly pounced (as a bird of prey), and has a broad flat bill—the tail quills armed with spikes as sharp as a needle."

Gould's notes are worth consideration. "This noble species, one of the

SPINE-TAILED SWIFT.

largest of the *Cypselines* yet discovered, is a summer visitant of the eastern portions of Australia, proceeding as far south as Tasmania; but its visits to this island are not so regular as to New South Wales. During the months of January and February it appears in large flocks, which, after spending a few days, disappear as suddenly as they arrived. I am not aware of its having been observed in Western Australia, neither has it occurred in any of the collections formed at Port Essington, although it doubtless pays that colony passing visits during its migrations. I believe it will be found that Indian and Australian examples do not differ. It is supposed to have been known to Pallas; and if so, it is the bird described by that author as *Hirundo ciris*. Von Schrenck found it in Amoorland, and it is also said to have once occurred in England. Mr. Jerdon states that it breeds among the huge wall-like crags of the Himalayas, and under the snow-level. The keel or breastbone of this species is more than ordinarily deep, and the pectoral muscles more developed than in any bird of its weight with which I am acquainted. Its whole form is especially and beautifully adapted for extended flights; hence it readily passes from one part of the world to another, and, if so disposed, may be engaged in hawking for flies on the continent of Australia at one hour, and in the next be similarly employed in Tasmania. So exclusively is this bird a tenant of the air, that I never, in any instance, saw it perch, and but rarely sufficiently near the earth to admit of a successful shot; it is only late in the evening and during lowery weather that such an object can be accomplished. With the exception of the Crane, it is certainly the most lofty as well as the most vigorous flier of the Australian birds. I have frequently observed in the middle of the hottest days, while lying prostrate on the ground with my eyes directed upwards, the cloudless blue sky peopled at an immense elevation by hundreds of these birds, performing extensive curves and sweeping flights, doubtless attracted thither by the insects that soar aloft during serene weather; on the contrary, the flocks that visit the more humid climate of Tasmania necessarily seek their food near the earth."

Miss Cheney recorded in the *Emu*, Vol. XIV., p. 207, 1915, for the Wangaratta District, Victoria: "In 1914 these birds remained until the end of April. Usually we did not see them after February. I think there must have been an unusual number of insects to keep them, they were skimming so close to the ground. Two or three were seen on the 5th November last, but the main flight did not come until December."

Mr. J. W. Mellor wrote me: "I have seen these large Swifts common in Tasmania, where they fly about in mid-air, capturing their insect food on the wing, never seeming to tire, as they are not seen to settle to rest from morning till night."

THE BIRDS OF AUSTRALIA.

Mr. H. S. Dove, of West Devonport, Tasmania, sent me a series of valuable notes at various dates : " May 6, 1911 : Have any of your correspondents gone into the connection of the Spine-tailed Swift with atmospheric disturbance ? Years ago, at Mount Bischoff, North-west Tasmania, I remarked that this species would often make its first appearance at the tail of a summer cyclone, flying leisurely at a considerable altitude as the clouds dissipated. Recently I have made a good many entries on the subject, the results showing that if bad weather is not actually existent when the Swifts appear, it will certainly follow in a day or two. This may be worth mentioning, so that eventually some light may be thrown on the habits of this curious bird. Thus : Cuninghame, E. Gippsland, Victoria, Dec. 8, 1910. Great company of Spine-tailed Swifts suddenly appeared this morning for the first time this season, circling and wheeling at heights varying from the tree-tops to practically out of sight in the blue. They were first noticed shortly before 9 a.m. and appeared to come from E.N.E. On 10th and 11th December more companies of Swifts appeared, some passing within a few yards of the ground with a great swish of the long wings. The weather was fine during these appearances, but the following week we had high rough winds and rain, like equinoctial weather. Near the end of the same month (Dec.) two companies of Spine-tails were seen, *before* and *after* stormy days. On Jan. 6, 1911, in the *midst* of a thunderstorm, a company of these birds was seen making to the N.E., the wind at the time being N.W. Going up the Tambo River, E. Gippsland, on 1st Feb., 1911, many Spine-tails were seen flying backwards and forwards, some fairly low ; exceedingly hot, fine day, but two days after there was a heavy blow from the eastward. On Feb. 8, a fine bright morning, light easterly breeze, a large number of Spine-tails seen high in the air ; on morning of 9th rain fell steadily, and on 10th heavy squalls, wind and rain. West Devonport, Tasmania : March 11, 1911 : Numbers of Spine-tails appeared on 8th, 9th, and 10th inst. during disturbed, thundery weather with rain ; great floods in Victoria and parts of Tasmania. March 20 : Spine-tails again appeared, rain almost the whole day : the birds passed leisurely from west to east at a good elevation. April 16, 1911 : Perfect morning, sunny and genial, light sea breeze. On beach with friend, when we remarked Spine-tails flying over the scrub near beach, and I said : ' We shall soon have a change in spite of the cloudless sky.' That night masses of cumulus cloud appeared in the eastern sky, gradually worked up overhead, and resulted in a heavy downpour. (The birds seen in the morning were making towards the west, the breeze being off sea, about N.E., light). April 25 : This afternoon a number of the Spine-tails were flying over the beach to the N.W., at a height of perhaps 80 feet, apparently migrating ; weather cold, showery, squally, wind veering N.W. to S.W. April 27 : More Spine-tails flying towards N.W. in

SPINE-TAILED SWIFT.

long struggling party over beach and sea, at 60 to 80 feet elevation ; wind S.W., strong, cold. This is my last record, as they have not been seen since, and I believe it is the latest date recorded for this migrant." Since then Mr. Dove has forwarded me more notes, all confirming the observations above given that these Swifts are commonly seen about the time the weather changes. It is an interesting subject and worthy of attention by observers in other parts.

Mr. Frank Littler also wrote me : " Usually arrives in Tasmania towards the end of summer and it has nearly always been late in the afternoon before I have noticed it. Sometimes only a few stragglers appear, circling high in the air. At other times it suddenly comes into view in large flocks. I have observed it wheeling over Launceston as late as the end of May. When circling in the air it has a very graceful appearance, executing all manner of curves with hardly an apparent effort. Sometimes it just skims the surface of the ground, and at others it appears as a tiny speck in the sky. The only sound I have heard it utter was a sharp cry like that made by the Welcome Swallow when on the wing, only louder. Its food is entirely winged insects captured during flight. On March 6, 1909, a flock passed north at 9.30-10 a.m. against a boisterous north wind. My friend Mr. J. M. Thomson, of Cohuna, fifty miles north of here, saw a flock at 5 p.m. the same day."

Dove, continuing his observations, recorded in the *Emu*, Vol. XIV., p. 218, 1915 : " Swifts and Weather. In a paper read before the Royal Society of Tasmania a few years ago, I endeavoured to trace a connection between the appearances of the Spine-tailed Swift (*Chaetura caudacuta*), both in this State and in Victoria, and disturbed weather conditions, showing that, in all cases which had come under my observation, the appearance of this Swift meant atmospheric change. This was again strikingly demonstrated on 27th February, 1915, when, in the morning, I saw fifty or sixty of these fine birds coursing insects over the paddocks near the Don road. The day was sultry, but fine. Soon afterwards I met a friend who spends most of his life out of doors, and, like myself, takes pleasure in noticing natural objects. I told him that I had seen a large party of Swifts for the first time this summer, when he remarked : ' Then rain is not far off.' That very evening a light rain began to fall, and practically the whole of the following day was wet. Not only so, but for several days afterwards we had high winds and showers, culminating on the 7th and 8th of this month (March) in a tremendous north-westerly gale, which did a good deal of damage. All this disturbance came after months of fine, settled weather. Yesterday, 9th inst., the Swifts were migrating, passing in twos and threes every few minutes from S.E. to N.W. during the afternoon from two until four o'clock. I consider this early departure means cold and rough autumn weather. The Tiers, which are in view from my ground, are already white with snow."

THE BIRDS OF AUSTRALIA.

In the next volume (p. 61, 1916) the results of the next year's observations were given apparently amply confirming the suggested connection of these Swifts in Tasmania and weather disturbances.

I have used a trinomial for the Australian form, as the Indian *nudipes* is considered only subspecifically distinct. I have not seen specimens from the west coast; should such be secured, they might prove to belong to a different race or even species.

GENUS—MICROPUS.

MICROPUS Meyer und Wolf, Taschenb. d. Vögel, p. 280, 1810 Type *M. apus*.

Apus Scopoli, Introd. Hist. Nat., p. 483, 1777 Type *M. apus*.

Not

Apos Scopoli, *ib.*, p. 404.

Cypselus Illiger, Prodrum Mamm. et Av., p. 229, 1811 .. Type *M. apus*.

Also spelt—

Cipselus Vieillot, Analyse nouv. Orn., p. 38, 1816.

Not

Cypsela Meigen, N. Class Mouches, 1800, p. 31.

Brachypus Meyer, Vogel Liv. u. Esthl., p. 142, 1815 .. Type *M. apus*.

Brevipes P. (=S. Palmer) Analyst, Vol. IV., No. XV.,

Apl. 1, 1836, p. 101 Type *M. apus*.

THE typical Swifts differ from the preceding in lacking the spines to the extremities of the tail-feathers, an item of little import, and in the feathering of the tarsus with the four toes directed forwards.

The general bill formation is as in the preceding genus, the wing is very long and pointed, the second primary longest, the tail forked, not very long in proportion to the wings, and the feet very small. A feature not superficially discernible is the reduction of the number of the phalanges of the outer and median toes to three.

It is possible that the genus as accepted in the *Catalogue of the Birds in the British Museum* will later be subdivided, as there large and smaller species, tails forked or square, are included, but at the present time little superficial differences are to be seen.

MICROPUS PACIFICUS.

WHITE-RUMPED SWIFT.

(PLATE 348.)

Hirundo pacifica Latham, Index Ornith., Suppl., p. lviii., 1801 : New South Wales.

New Holland Sw(allow) Latham, Gen. Synops. Birds, Suppl., Vol. II., p. 259, 1801.

Hirundo pacifica Latham, Index Ornith., Suppl., p. lviii., 1801 ; Stephens in Shaw's Gen. Zool., Vol., X., p. 132, 1817.*Cypselus australis* Gould, Proc. Zool. Soc. (Lond.), 1839, p. 141, 1840 : New South Wales ; *id.*, Birds Austr., pt. ix. (Vol. II., pl. 11) 1842 ; Diggles, Orn. Austr., pt. vii, 1866 ; Witmer Stone, Austral Av. Rec., Vol. I., p. 152, 1913.*Cypselus vittatus* Jardine and Selby, Illus. Ornith., Vol. IV., text to pl. 39, 1840 ; New South Wales.*Micropus vittata* Boie, Isis, 1844, col. 165.*Micropus australis* Boie, *ib.**Cypselus pacificus* Blyth, Journ. As. Soc. Beng., Vol. XIV., p. 212, 1843 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 65, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 105, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878 ; *id.*, Tab. List Austr. Birds, p. 3, 1888 ; Mathews, Handl. Birds Austral., p. 56, 1906 ; Ingram, Ibis, 1908, p. 161 (Japan) ? ; Mathews, Emu, Vol. IX., p. 7, 1909 (N.W.A.) ; G. F. Hill, *ib.*, Vol. X., p. 272, 1911 (N.W.A.) ; Macgillivray, *ib.*, Vol. XIII., p. 161, 1914 (N.Q.) ; H. L. White, *ib.*, Vol. XVI., p. 221, 1917 (N.T.).*Micropus pacificus* Stejneger, Bull. U.S. Nat. Mus., No. 29, p. 321, 1885 ; Hartert, Cat. Birds Brit. Mus., Vol. XVI., p. 448, 1891 ; Hall, Key Birds Austr., p. 54, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 530 ; Carter, Emu, Vol. III., p. 95, 1903 (M.W.A.) ; Legge, *ib.*, p. 180, 1904 (Tas.) ; Berney, *ib.*, Vol. IV., p. 45, 1904 (N.Q.) ; *id.*, *ib.*, Vol. VI., p. 42, 1906 (N.Q.) ; Littler, *ib.*, Vol. X., p. 50, 1910 (Tas.) ; *id.*, Handb. Birds Tasm., p. 75, 1910.*Apus pacificus* Hall, Emu, Vol. VIII., p. 148, 1909 ; Mathews, Nov. Zool., Vol. XVIII., p. 292, 1912.*Micropus pacificus pacificus* Mathews, List Birds Austr., p. 153, 1913.*Micropus colcloughi* Mathews, Austral Av. Rec., Vol. II., p. 129, Jan. 28, 1915 : Cape York.

DISTRIBUTION. Australia and Tasmania Extra-limital.

Adult female. General colour above and below black or blackish-brown with a steel-blue gloss on the back and bronze-green reflections on the flight-quills ; inner-webs of the



Roland Green, del.

Witherby & Co.

$\frac{2}{3}$
MICROPUS PACIFICUS.
(*WHITE-RUMPED SWIFT*).

WHITE-RUMPED SWIFT.

primary and secondary quills pale brown, secondaries slightly edged with white ; rump white, head not quite so dark as the back with slight pale edges to the feathers ; a narrow whitish line above the eye ; sides of face and sides of throat brown, the feathers slightly edged with white ; throat and fore-neck white ; entire under-surface blackish, with white edges to the feathers ; under wing-coverts brown with white or buffy-white tips to the feathers ; under-surface of quills and lower aspect of tail glossy brown. Eyes brown ; feet and tarsus brown ; bill black. Total length 185 mm. ; culmen 7, wing 178, tail 80, tarsus 12. Figured. Collected at Point Torment, North-west Australia, on the 10th of March, 1911.

Adult male. Similar to the adult female.

Nest and Eggs. Not authenticated.

THIS species has a similar history to that of the preceding, being described by Latham from a "Watling" drawing. Then Pallas described it from its northern limit, while Gould and Jardine named it again from Australia ; the correct name, which has since been consistently used, being recorded in 1843.

It belongs to the true Swifts, and is apparently so alike that Pallas only ranged it as a variety of the typical Swift. It is thus peculiar that the Watling drawing should have been named by Latham, "New Holland Swallow," while Watling observed : "This is the supposed female of No. 1," that is, the Spine-tail.

Gould wrote : "As I had never seen or heard of a true Swift in Australia, I was no less surprised than gratified when I discovered this species to be tolerably numerous on the Upper Hunter, during my first visit to that district in 1838. Those I then observed were flying high in the air, and performing immense sweeps and circles, while engaged in the capture of insects. I succeeded in killing six or eight individuals, among which were adult examples of both sexes ; but I was unable to obtain any particulars as to their habits and economy. It would be highly interesting to know whether this bird, like the Swallow, returns annually to spend the months of summer in Australia. I think it likely that this may be the case, and that it may have been frequently confounded with the *Acanthylis caudacuta*, as I have more than once seen the two species united in flocks, hawking together in the cloudless skies, like the Martins and Swallows of England. . . . It is considered by some ornithologists that this bird and the Swift with crescentic markings of white on the breast, which inhabits China and Amoorland, are the same. If this supposition be correct, this species ranges very widely over the surface of the globe."

Mr. Frank Littler wrote me : "Some half a dozen birds were seen on Feb. 13, 1902, in company with a number of Spine-tailed Swifts, just at dusk, about South Launceston. They flew so low that I had no difficulty

THE BIRDS OF AUSTRALIA.

in distinguishing the two species, but this bird is a rare visitor to Tasmania."

Captain S. A. White has written me: "These wonderful birds always visit us during thundery conditions with northerly winds, which always come before a change in the weather. During the summer they attract one's attention by their whistling call, something like the sound produced by forcing the breath through closed teeth, only much louder: upon looking up they will be seen at times very high, describing circles in the air and flying at great speed. Many are of the opinion that these birds do not roost at night, but keep up their flight. One night just at dusk I saw a large party swoop down in a dense mass and enter the flags and reeds growing in a swamp, where they took up their quarters for the night. Upon one occasion specimens taken were found to be infested with vermin (flying lice)."

Mr. J. W. Mellor's notes read: "At times these large Swifts pay visits to South Australia, and I have often seen them flying about the Adelaide Plains at the Reedbeds, but have not known them to settle even to rest, although sometimes they stay several days before departing again for more northern climes. Their visits here are generally in the summer time, and are the forerunners of stormy weather; their flight seeming to be forced in front of the wind and rain, and after hot sultry conditions; they come a few at first and high up in the air, then more arrive, until hundreds can be seen at once, and often very close to the ground, but generally they are well up in the air out of gunshot reach. They utter a peculiarly weird and loud whistle or wheezy screech as they dart about, and thus their presence is at once made known. They can be seen 'hawking' about after the insects, which are always plentiful just at the time and condition of the weather when the Swifts arrive. When departing they circle up to a great height and eventually are lost to view when they make away. Their large size and long narrow 'rakish' cut of wing make them very conspicuous in the air, and they can be easily distinguished from our common Swallows and Tree Martins with which they mingle during their aerial visitations to these parts."

Macgillivray recorded (*Emu*, Vol. XIII., p. 161, 1914): "White-rumped Swift. Mr. M'Lennan made notes at Sedan on 11th February, 1910, that probably applied to this bird: 'Saw a large flight of Swifts passing over the tent at 7 p.m., flying north. Could not identify them, as it was too dark. 14th Feb., 1910. Another flight of Swifts passed over, going north, at dusk. 8th April, 1910. Saw some Swifts flying south-west this afternoon—Australian Swifts I think they were, as I distinctly saw the white rump. One of the men on the station told me that they usually put in an appearance after a steady fall of rain. At Cape York the earliest note is 5th November, 1911: Australian

WHITE-RUMPED SWIFT.

Swifts noted flying south. 16th Nov., 1911. Lockerbie. Australian Swifts flying south to-day. 26th Dec., 1911. Saw a great flock of Swifts circling over the house a little before sundown. 4th March, 1912. Paira. A large flock of Australian Swifts noted flying in a southerly direction. 31st March, 1912. Lockerbie. A large flock of Australian Swifts hawking over the forest country all day. 17th April, 1912. Lockerbie. A few Australian Swifts hawking over open forest country near the house at sunset.' "

Berney wrote (*Emu*, Vol. IV., p. 45, 1904): "Always more numerous (in North Queensland) than their Spine-tailed relative. In 1902 they did not show up till 2nd January, while in 1903 they made their first appearance on 5th November. In both years they left again during the first week in April." In the sixth volume, p. 42, 1906, he added: "A summer visitor, arriving about the end of September, when circumstances are very favourable, but as likely as not the first representatives will not be seen till November; the early part of April sees them off again. Verily, they are birds of passage—they never seem to have time to stop. Attracted by their screaming, you look up to see them racing high up overhead; they are in sight for thirty seconds, and then gone again. It is not often they come down low to feed, and I never saw them settle."

Mr. Tom Carter has given me the following account: "These birds were occasional visitors to Point Cloates in the summer months. They were usually observed when strong hot winds from the north-east were blowing, and their appearance was almost invariably a sign of unsettled weather. Sometimes they were seen in immense numbers, notably on April 1st and 2nd in 1898, when ceaseless streams of them were flying south from daylight until night. Cossack and Roeburne (towns of considerable size, situated 250 miles N.E. of Point Cloates) were partially destroyed by a hurricane on April 2, 1898. On March 6, 1900, great numbers of these birds were also seen at Point Cloates, and a hurricane raged there that night. These birds were never observed by me in the south-west."

Mr. J. P. Rogers' notes read: "(Parry's Creek, North-west Australia). Oct. 24, 1908. Some of these birds were flying fairly high, but just within gunshot and one specimen was secured. There was only a small flock. A large flock of these birds had been noted on September 24, but I could not be sure of their identity until I secured the present specimen. Nov. 7.—A flock passed by my camp at 5 p.m. flying high, and next morning another flock passed at 8 a.m."

Point Torment, North-west Australia, March 22, 1911: These birds were here in hundreds to-day, a fall of two inches of rain the night before had brought out many flying ants and these birds were hawking for them within a few feet

THE BIRDS OF AUSTRALIA.

of the ground. It is unusual to find them flying so low as they are a difficult bird to collect under ordinary circumstances. March 30, 1911. Since the 22nd these birds have been very numerous, but fly very high. April 5. Still numerous. April 8. Flocks passed to-day, flying very high. Melville Island, Oct. 15, 1911. A few birds passed the camp to-day flying very high, and on Nov. 7, 1911, a small flock was seen late in the evening and none were afterwards noted."

MacLennan's notes read (*Emu*, XVI., p. 221, 1917): "King River, Nov. 24, 1915. Bird seen flying southwards. Dec. 11, 1915. Large flock of Swifts passed over camp after the rain, but not sure of identity. Dec. 12, 1915. Another flock passed after a heavy shower. Dec. 25, 1915. A number of *C. pacificus* seen circling high over sandstone ridges."

I differentiated a form as *Micropus colcloughi*, but it is quite uncertain whether there are races or species of this group to be recognised as visitors to Australia. There may be races of migratory birds, but it is difficult to determine such without good series of locally sexed individuals. Thus, some specimens have a greenish gloss, others a bluish gloss; some have the rump band larger than it is in others; while, sometimes, the shaft stripes on the throat are more distinct than at others; further, the whitish barring to the feathers of the under-surface is sometimes prominent, sometimes obsolete. The relationship of these phases is not well known, some authorities considering one form the adult, some regarding the other as representing the adult plumage. Series of Japanese birds of apparently breeding age show both phases, so that the matter is still complicated, as the differences do not appear to be sexual.

The peculiar case I alluded to previously is as follows: Harington described a subspecies breeding in Burmah as smaller. I examined the bird and found that the wing was undoubtedly smaller, but the first primary was longest. I suggested the bird was not fully grown, as in the Australian adults the second primary is longest. Series being procured it was found that these were still constantly smaller and, moreover, that the first primary was constantly longer. More careful criticism showed that the tail-forking was also slightly different, and that the subspecies was a valid one, the differences being probably due to its more restricted habitat. Under these circumstances it is possible that the two forms discussed above may represent different breeding races, and further that a third may occur in west Australia, as it is improbable that the Japanese bird would migrate to that locality, even if it occurred in eastern Australia. I am afraid the matter of races of this Swift will not be easily solved, as its ally, *M. apus* and its subspecies and migrations into Africa are still involved in much obscurity.

WHITE-RUMPED SWIFT.

The species is given in the *Catalogue of the Birds in the British Museum*, Vol. XVI., p. 448, 1891, as having as habitat, "Mongolia, Baikal and the Amoor in the north, Assam, Cachar and Burmah in the west, and extending over China and Japan to Australia, where it is probably only a winter visitor." The exact breeding place of the Australian visitor is at present unknown as the above range is now known to cover subspecific forms and, as noted above, the breeding plumages are not exactly determined.

ORDER CUCULIFORMES.

PROBABLY the typical member of this Order is one of the best known of birds in the Old World, perhaps by name only, on account of its peculiar call and its peculiar breeding habits. The bird itself is not such a familiar object, but through the parasitism in regard to its young it has an extraordinary literature. Even at the present time many pages of important bird periodicals are continually being devoted to the attempted elucidation of its habits. To Australian workers "Cuckoos" are very familiar, though the typical one is missing, as is the well-known call note. The parasitic habits in connection with their egg disposition, however, persists through the order, so that this is very familiar to Southern egg collectors. Many species are included in the Australian Avifauna, and these are of varied type from the very small *Lamprococcyx* to the huge *Scythrops*. Seven genera, including fourteen species, were admitted by Gould in his "Handbook" in the family *Cuculidæ* now raised to the rank of an Order, and subdivided into three or more families. Thus, while recognising the majority of "Cuckoos" as referable to one family—a by no means accurate conclusion—*Scythrops* must be acknowledged to be separable as a family, while few will deny that value to the *Centropodidæ*. In the *Catalogue of the Birds in the British Museum*, Vol. XIX., 1891, the latter was given subfamily rank, while the former was placed in the typical subfamily, a somewhat peculiar association.

Sundevall, twenty years previously, had separated *Scythrops* with *Eudynamis* from the true Cuckoos and placed them with *Coccystes* and *Coccyzus* as constituting another family.

Beddard has shown that the anatomy is complex and consequently difficult to deal with as a whole: he recommended subdivision into three, two of these being again divided. His arrangement was put forward in such a manner that criticism is scarcely possible, as his lack of material was greater than that available. He only regarded the group as of family rank, a value quite unacceptable under present-day views. This was divided into three subfamilies, the first into two sections (unnamed): *Cuculus*, *Chrysococcyx*, *Cacomantis*, *Coccystes* (?) and *Saurothera*, *Diplopterus* (?), *Piaya* and *Coccyzus*. I would eliminate *Coccystes* from the first group, then range *Cuculus* and *Cacomantis* together, and separate *Chrysococcyx* sectionally. The second subfamily covered *Scythrops*, *Eudynamis* and *Phœnicophæes*. I would separate all these three, and if *Eudynamis* is near *Scythrops* would give it family

CUCULIFORMES.

rank also, but not include it in the same family. The third is also divided into two, *Pyrrhocentor*, *Centropus*, *Coua* (?) and *Geococcyx*, *Crotophaga* and *Guira*. This arrangement is certainly in need of emendation and *Centropus* is commonly regarded as standing alone in the Order.

The extra-limital birds classed as Cuckoos show such varied forms that many genera are necessarily accepted even by the genus-lumper. It is probable that many families will later be used when the anatomy of the forms is thoroughly investigated. As above noted, three or four families should be used in conjunction with Australian representatives, viz., *Cuculidæ*, *Eudynamisidæ*, *Scythropidæ* and *Centropodidæ*, the doubtful one being the second named. Superficially it might be classed in the *Cuculidæ*, but it has many resemblances in its osteology to *Scythrops*, but it should not be classed with that very distinct group on account of these, as just as many differences can be recorded.

The distinctness of the *Centropodidæ* will later be shown, but here it may be observed that they habitually make their own nests and rear their young, a feature very uncommon in the Order, and that they constitute a compact group ranging from Africa, through southern Asia to Australia, almost unchanged as to coloration as well as structure, indicating that they are quite an ancient group.

The superficial characters of members of the Order are the zygodactyle feet, peculiar bill, and tail of ten feathers (two extra-limital genera have eight only). As suggested above, the Order seems somewhat of a heterogeneous nature and it is probable that later detailed anatomical study will enable the differentiation of the perplexing elements. Thus the *Centropodidæ* need careful criticism from every point of view, so that their exact relationships can be exposed. Again, an interesting item is the evolution of *Scythrops*, as it is quite an aberrant form at present. *Eudynamys* also needs consideration, especially with relation to *Urodynamis*, while the isolation of this last-named group is an extraordinary feature. All appear to be migrants to a greater or less extent, but the movements of the Australian species are more or less local, so that they can almost be considered non-migratory, as the latter term is commonly used. The distribution over the earth's surface is also worthy of attention in consideration with their evolution, as many species are now restricted to small areas.

As characteristic, may be noted their parasitical habits, and so much has been written concerning these that a full volume could easily be prepared covering extracts, discussions, etc., of the habits, reasons and theories. In this place I propose scarcely to touch upon the points in dispute, but would merely note that the "Cuckoo" lays one or more eggs, apparently upon the ground, and thence transfers the egg by means of its bill to the nest of a small

THE BIRDS OF AUSTRALIA.

bird and there leaves it. The egg is hatched by the small bird and the young Cuckoo then ejects its neighbouring (and rightful) chicks and is reared by the foster-parents, who continue to feed it after it has left the nest. The dubious points are the number of eggs laid, the manner of nest selection, the relation of the egg coloration of the Cuckoo to that of the bird selected, the rejection or acceptance of the strange egg by the foster-mother, and such-like queries, capable of much discussion but of doubtful settlement. Other features of interest are the small size of the Cuckoo's egg as compared with the bird itself and the incubation period being shorter than eggs of the same size. Some of the above items are not concerned with all the species, but are generally given as being of interest in the typical species of the Order.

The gradation of the three groups *Cuculus*, *Cacomantis* and *Chrysococcyx* is very peculiar, as it is marked in most particulars, size, coloration, length of tail, etc.; yet it is possible we see here again instances of convergence, as often met with when dealing with ancient groups. Thus *Cuculus* is close to *Cacomantis*, and *Heteroscenes* is somewhat intermediate, so much so that it was first classed in one group and then in the other when the two groups were recognised. The Bronze Cuckoos have been continually separated from *Cacomantis* on account of their bronze coloration and smaller size; but here again some species are dull, while it is obvious that the bronze species are separable into groups and have evolved more or less independently. Thus, the African series seem quite distinct from the Asiatic and Australian series; and, moreover, two or more sections can be seen among the former as well as among the latter, the sections being different in each case. I discussed these some years ago and concluded that the plumage changes would serve as a good basis for accurate differentiation, and since then I have not altered my opinion, though modification must be necessary in this as in most other matters with more material. Thus I conclude that geographical considerations must be maintained at a high value, whereas most workers minimise such. In the present instance the above named groups are of similar geographical range, and it is possible that *Heteroscenes* is the Australian representative of *Cuculus*, while *Cacomantis* is similarly allied but has degenerated more quickly and become separable into many forms, specific and subspecific. Then the Bronze Cuckoo of Africa have arrived at a similar coloration to those of Malay-Australasia, though derived from a different source. These small Cuckoos are common in species in Malay-Australasia and form a complex group, and as noted above the best guide to their affinities appears to be through their plumage changes, which somewhat differ as will be shown later.

The diversity of the species negatives consideration of the extra-limital species such as occurred commonly in previous orders, but one or two items may be recorded.

CUCULIFORMES.

The range of *Cuculus* is given in the *Catalogue of the Birds in the British Museum* as "the whole of the Old World, excepting Polynesia," but the genus there recognised covers three groups, *Cuculus*, *Penthoceryx* and *Heteroscenes*. The range of the first name is practically that given, but it only ranges into North Australia; *Penthoceryx* is Indo-Malayan not reaching Australia; while *Heteroscenes* is confined to Australia and is another of the peculiar endemic Australian groups.

The genus *Cacomantis* is Indo-Malayan, and this group may be divisible into sections, as three species occur in Australia which differ in detail, though of similar general appearance.

Under the name *Misocalius* a genus is recognised with the distribution "Australia, Aru, Kie and Batchian Islands." I have renamed this genus *Owenavis* and it is certainly a peculiar endemism practically confined to Australia and unlike any of the other species. Then come the Bronze Cuckoos, which were classed under the name *Chalcococcyx* and are Indo-Malayan in range. These are so similar in form and their movements so unknown that the specific relations are more or less doubtful. I divided this genus into three, allowing *Chalcococcyx* to remain for its type species, quite unlike the rest of the series which I divided into two, *Lamprococcyx* and *Neochalcites*, the majority of the species being referable to the first named of these two. The migrations of these species are more or less local, and probably many races will later be distinguished, but the islands to the north of Australia, as well as New Guinea, shelter birds which differ in so many items in such confusing manners that little reliance can be placed upon any conclusions arrived at the present time.

I am recording the results of a careful study of these little birds and am not dogmatic on any point; but, dealing solely with facts, consider it advisable to withhold speculation. I, however, see little relationship with the Bronze Cuckoos of Africa and suggest those have evolved quite independently.

GENUS—CUCULUS.

CUCULUS Linné, Syst. Nat., 10th ed., 1758, p. 110 Type *C. canorus*.

Nicoclarius Bonaparte, Ateneo Italiano, No. 8, p. 121

(Consp. Volucrum Zygod., p. 6), 1854 Type *C. optatus*.

THE true Cuckoos are birds of medium size, with decurved bills, long wings, long tail, and small legs and feet.

The bill is straight, with tip sharp and decurved, but not hooked ; base comparatively narrow, under mandible somewhat flattened. The nostrils appear as circular apertures situated near the base of the upper mandible, rather low down.

The wing is long, the feathers pointed towards their tips, otherwise rather broad ; three feathers comprise the tip, the first primary being short, not much more than half the length of the third, which is longest ; the second is not much shorter than the third and a little longer than the fourth, which much exceeds the fifth and succeeding primaries.

The tail is long, feathers broad, of a rounded wedge shape ; it is about two-thirds the length of the wing.

The tarsus is very short, almost hidden by the feathers of the thigh, but unfeathered, roughly scutellate in front, and reticulate behind. The toes are long : the middle toe being longest, the inner shorter than the outer, the hind small.



Roland Green, del.

Witherby & Co.

$\frac{3}{5}$
CUCULUS OPTATUS.
(ORIENTAL CUCKOO).

CUCULUS OPTATUS.

ORIENTAL CUCKOO.

(PLATE 349.)

CUCULUS OPTATUS Gould, Proc. Zool. Soc. (Lond.) 1845, p. 18 : Port Essington, Northern Territory.

Cuculus optatus Gould, Proc. Zool. Soc. (Lond.) 1845, p. 18 ; *id.*, Birds Austr., pt. XXI. (Vol. IV., pl. 48), 1845 (Dec.) ; Gray, Genera Birds, Vol. II., p. 463, 1847 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 103, 1850 ; Mathews, Nov. Zool., Vol. XVIII., p. 292, 1912 ; *id.*, List Birds Austral., p. 154, 1913 ; Witmer Stone, Austral Av. Rec., Vol. I., p. 152, 1913 ; Macgillivray, Emu, Vol. XIII., p. 162, 1914 (N.Q.) ; H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

Cuculus fucatus Peale, U.S. Expl. Exped., p. 136, 1848 ; 2 ed., p. 244 : Sooloo Islands.

Nicoclarus optatus Bonaparte, Consp. Vol. Zygod., p. 6, 1854.

Cuculus optatus (cantor) Lichtenstein, Nomencl. Av. Mus. Berol., p. 78, 1854.

Cuculus horsfieldii Moore in Horsfield and Moore's Cat. Birds Mus. East India Comp., Vol. II., p. 703, 1857 : Java.

Cuculus tenuirostris (nec Lesson) Cassin, U.S. Expl. Exped., p. 244, 1858.

Cuculus cantor "Ill." Cabanis and Heine, Mus. Heine, Vol. IV., p. 34, 1862 : nom. nudum.

Cuculus canoroides Gould, Handb. Birds Austr., Vol. I., p. 614, 1865 ; Ramsay, Proc. Linn. Soc., N.S.W., Vol. II., p. 192, 1878 ; *id.*, Tab. List Austr. Birds, p. 15, 1888.

? *Cuculus bubu* Dybowski, Journ. für Orn., 1868, p. 336 : nom. nudum.

Cuculus peninsulæ Stejneger, Bull. U.S. Nat. Mus., No. 29, p. 227, 1885 : Commander Islands.

Cuculus intermedius (part) Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 252, 1891 ; Hall, Key Birds Austr., p. 58, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 563, 1901 ; Berney, Emu, Vol. VI., p. 44, 1906 (N.Q.).

Cuculus saturatus (nec Blyth) Mathews, Handl. Birds Austral., p. 57, 1908 ; *id.*, Emu, Vol. X., p. 109, 1910 (N.W.A.) ; Broadbent, *id.*, p. 239 (N.Q.) ; Barnard, *id.*, Vol. XI., p. 24, 1911 (N.Q.).

? *Cuculus optatus belli* Mathews, Bull. Brit. Orn. Club, Vol. XXXVI., p. 83, May 25, 1916 : Lord Howe Island.

Cuculus optatus optatus Mathews, *ib.*

DISTRIBUTION. New South Wales ; Queensland ; Northern Territory ; North-west Australia. Extra-limital.

THE BIRDS OF AUSTRALIA.

Adult male. General colour of the upper-surface slate-grey, including the head, back, and wings with a bottle-green gloss on the last; primary and secondary quills pale brown on the inner-webs, white at the base and barred with white on the outer primaries; tail dark brown with a steel-blue gloss, the feathers tipped with white and irregularly marked with the same colour which takes the form of short twin lines along the shafts of the middle feathers, and slightly fringed in places, on the outer webs these white marks are increased in extent on the lateral feathers; head paler than the back, with dark shaft-lines to the feathers; throat, fore-neck and upper-breast ash-grey; lower-breast and abdomen white barred with dark brown; under tail-coverts buff also barred with dark brown; under wing-coverts isabelline barred with ash-grey; under-surface of quills pale brown barred with white; lower aspect of tail dark brown tipped and marked with white. Eyes dark yellow, eyelash yellow; feet and tarsus yellow; bill, upper mandible and distal half of tomium of lower mandible black, balance of lower and base of upper mandible olive-grey. Total length 355 mm.; culmen 20, wing 210, tail 153, tarsus 21. Figured. Collected on Parry's Creek, North-west Australia, on the 26th of January, 1909.

Adult female. Very similar to the adult male.

Immature. Upper-surface brown barred with rufous and more obscurely with white; fore-part of head for the most part rufous with brown tips to the feathers, while some of the feathers are barred with white, those above the eye and on the sides of the neck subterminally; lesser upper wing-coverts dark brown very slightly edged with white like the median and greater series and tips of primary-coverts, inner primary and secondary quills; some of the scapulars and feathers on the lower back, rump, and upper tail-coverts have pale pin-like marks on the shafts, the lateral upper tail-coverts are slightly fringed with white at the tips; tail bronze-brown with oblique rufous bars, white marks on the shafts, and white tips to the feathers, becoming paler on the outer feathers where the white pattern is more extended; sides of the face, throat, fore-neck and upper-breast buffy-white barred with brown; lower-breast, abdomen, axillaries, and sides of the body creamy-white barred with brown; under tail-coverts buff, irregularly marked with brown; under wing-coverts creamy-white with a buffy tinge; quills below pale brown barred with white or very pale rufous; lower aspect of tail similarly coloured with white tips to the feathers. Eyes pale brown; feet yellow; bill under mandible pale brown; upper black; gape yellow; greenish brown line on upper mandible towards the gape. Figured. Collected at Kuranda, North Queensland, on the 30th of January, 1912.

Egg and Breeding-season. Not recorded.

WHEN Gould received specimens of this Cuckoo he at once described them under the name *Cuculus optatus* and figured it under that name. In his "Hand-book," however, he used the name *Cuculus canoroides* Muller with a query mark after it, but without further explanation. His account then read: "The northern part of Australia is the only locality in which this bird has been found; the specimens I have seen were killed in the month of January; whether it utters the word "Cuckoo" or not I am unable to say, but it is most likely that in its voice, as in its form and general appearance, it closely assimilates to its European relative. In the Australian bird the black bands on the breast are broader and more defined than in the European *C. canorus*; the claws of the Australian bird are also smaller and more delicate than those of its European ally."

ORIENTAL CUCKOO.

Mr. Edwin Ashby has written me: "I received a couple of specimens of *Cuculus optatus* Gould from Mr. C. E. May collected at Anson Bay, Northern Territory, in 1911, with the statement that these Cuckoos had visited that locality in considerable numbers at the time of sending. One skin I gave to you and the other to the South Australian Museum. Mr. May has been on the look-out to secure me another specimen, but has not been able to get me any since. It looks as if they did not occur at Cape Ford, where Mr. May was afterwards stationed."

Mr. K. Broadbent in the *Emu*, Vol. X., p. 239, 1910, wrote: "This is a summer visitant to Cardwell (N. Queensland) arriving in November, and leaving end of February. A very solitary bird. I have seldom seen two together. It keeps near the beach, about Cardwell, in the low bushes. I have never seen this bird inland more than five miles from the coast. It utters a note not unlike *Cacomantis pallidus*, but seldom; it is a quiet bird, very Hawk-like in its flight, and shy to get a shot at. Very early morning is the only time to get specimens."

Barnard recorded (*Emu*, Vol. XI., p. 24, 1911): "Fairly plentiful in forest country at Cape York. Very shy and not easily obtained."

This was corroborated by McLennan whose notes Macgillivray published (*Emu*, Vol. XIII., p. 162, 1914): "This Cuckoo was on several occasions noted at Cape York in the summer months. It was never there in numbers: it was exceedingly shy, and so difficult of approach that no specimens were obtained."

Mr. J. P. Rogers wrote: "Melville Island, Dec. 11, 1911. One pair only seen, one of which was secured. Jan. 13, 1912. Some were seen nearly every day on the north side of the island, but none were procured, as the species is very wild here."

Berney (*Emu*, Vol. VI., p. 44, 1906), wrote: "Gathering up (early in May) a handful of feathers, all that remained after a Hawk's meal, of a species of Cuckoo that was strange to me, I forwarded them to Mr. A. J. Campbell for his opinion, who replied that he thought they were referable to this species, and with this I concur."

The correct name of this Cuckoo appears to be the one given it by Gould, but this result has not been arrived at without a long series of vicissitudes. Thus in his "Handbook" Gould doubtfully used Muller's name of *Cuculus canoroides*. In the *Catalogue of the Birds in the British Museum* this species was lumped with others under the name *Cuculus intermedius* Vahl, the range being given as "from Siberia and Japan, south throughout China and the Indian Peninsula, through the Malay Archipelago to New Guinea, New Britain and Australia."

THE BIRDS OF AUSTRALIA.

In my "Handlist," following Sharpe's advice, I altered the name to *Cuculus saturatus* Blyth, but during the preparation of my "Reference List" I found that the names selected had been all of a doubtful nature, and therefore in the *Austral Avian Record*, where I published some preliminary notes on Cuckoos, I wrote (Vol. I., p. 9): "The races of *Cuculus canorus* Linné are difficult to determine, and as the material at my disposal does not warrant me in still accepting *C. saturatus* from a study of the original description, I am reverting to the name proposed by Gould, *C. optatus*. A name, given by S. Müller, *C. canoroides*, may be applicable, but in the present uncertain state of the nomenclature of the species, I am using the name certainly available, as it was given to the Australian form. Dr. Hartert is now working upon these puzzling birds for his *Vogel der palaëarktischen Fauna*, and when the results of his studies are published I shall be able to make a more positive decision. I am tentatively referring to the Australian form as *Cuculus canorus optatus* Gould."

In my "Reference List" the name used was *Cuculus optatus* Gould, as Hartert showed me that the Australian bird was specifically distinct, and further agreed after some hesitation that my choice of Gould's name must be upheld.

It is, however, probable that subspecies are distinguishable, and I separated the birds from Lord Howe Island collected by Mr. Roy Bell as *Cuculus optatus belli* on account of their paler coloration as well as larger size. Further, the immature from Australia and Lord Howe Island differ from immature from Halmahera. It is unfortunate that we do not yet know the lines of migration in the east or else we might be able to trace the different subspecies.

The British Ornithologists' Union's Expeditions to South-west New Guinea met with this bird, and Claude Grant noted, as given in the *Ibis*, Jubilee Suppl., No. 2, Dec., 1915, p. 182: "A few examples of this Cuckoo were met with occasionally. They frequented posts and stumps of trees in the clearings around the camps. They uttered no call, and were by no means wild." In the same place Ogilvie-Grant observed: "These specimens vary considerably in size: ♂ ad. wing 194 mm.; ♀ ad. 191 mm.; ♂ imm. in first plumage 179; ♀ imm. 180 mm; ♂♂ imm. 195, 199 mm."

These immature also differ from the Australian birds, so that it is possible that the birds which arrive in the north-west of Australia travel by a different route from those that come down via Cape York, while the Lord Howe birds may represent still a third route. It is best to put these items on record, as so little is yet known concerning these Cuckoo movements.

The type of Gould's *optatus* was described from Port Essington, so that there is a probability of the large Lord Howe Island visitor being distinct.

Though I have immature from Australia, I do not know that the egg has

ORIENTAL CUCKOO.

been found in our country, and H. L. White in the *Emu*, Vol. XIV., p. 146, 1915, records as the foster-parent of the egg or eggs in his collection "*Phyllergates coronatus* (Japan sp.)."

Birds from the Island of Waigou are darker above than *Cuculus optatus* Gould and the bands on the under-surface darker. Wing 195 mm. For this bird I introduce the name *Cuculus waigoui* sp. n. Type a male collected on Waigou Island on the 7th of February, 1903.

GENUS—HETEROSCENES.

HETEROSCENES Cabanis und Heine, Mus. Hein., Vol. IV.,
p. 26, 1864 Type *H. pallidus*.

THIS monotypic genus is confined to Australia and is somewhat intermediate between *Cuculus* and *Cacomantis*.

In coloration it is dissimilar from either, the immature plumage being quite peculiar while the tail is proportionately longer.

It is difficult without anatomical assistance to suggest the derivation of this group, whether from *Cacomantis* or *Cuculus*. Its peculiarities are best indicated by the usage of the generic name Cabanis and Heine allotted to it.

It is noteworthy that here also Australia appears to have an endemic genus, while the true *Cuculus* appears as a visitor from the north. *Cacomantis* is represented in a somewhat similar manner, and the Bronze Cuckoos show peculiarities also.

As Cuckoos are so plentiful in Australia a comparative examination of the nestlings of the species would provide much of great value, and assist in the elucidation of the relationships and development of the groups. Thus it might be suggested that the nestling of the present group and the nestling of true *Cuculus* might show little differences, whereas there might be more between this and *Cacomantis*. It is just as probable that the reverse might be seen, as this may have really altered more, though superficially so little difference can be seen.



H. Grönvold, del.

Witherby & Co

$\frac{4}{5}$
HETEROSCENES PALLIDUS.
(PALLID CUCKOO).

HETEROSCENES PALLIDUS.

PALLID CUCKOO.

(PLATE 350.)

COLUMBA PALLIDA Latham, Index Ornith., Suppl., p. lx., 1801 : New South Wales.

Pale Pigeon Latham, Gen. Synops. Birds, Suppl., Vol. II., p. 270, 1801.

Columba pallida Latham, Index Ornith., Suppl., p. lx., 1801 ; Mathews, Austral Av. Rec., Vol. III., p. 1, pl. I., 1915.

Cuculus variegatus (not Scopoli, 1786) Vieillot, Nouv. Dict. d'Hist. Nat., Vol. VIII., p. 224, 1817 : New South Wales ; Pucheran, Revue Mag. Zool., 1852, p. 555.

Cuculus cinereus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. VIII., p. 226, 1817 : New South Wales ; Pucheran, Revue Mag. Zool., 1852, p. 556.

Cuculus inornatus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 297, 1827 : New South Wales ; Gould, Birds Austr., pt. xxv. (Vol. IV., pl. 85), 1846 ; Mathews, Handl. Birds Austral., p. 57, 1906 ; Ingram, Ibis, 1908, p. 467 (N.Q.) ; Mathews, Emu, Vol. IX., pp. 7-58, 1909 (N.W.A.) ; *id.*, *ib.*, p. 68 (N.T.) ; Hall, *ib.*, p. 130, 1910 (S.A.) ; Crossmann, *ib.*, p. 150, 1910 (N.W.A.) ; Whitlock, *ib.*, p. 193 (W.A.) ; Howe (*ornatus*) *ib.*, p. 230 (Vic.) ; Mathews, *ib.*, Vol. X., p. 110, 1910 (N.W.A.) ; G. F. Hill, *ib.*, p. 272, 1911 (N.W.A.) ; North, Austr., Mus. Spec. Cat., No. 1, Vol. III., p. 1, 1911 ; G. F. Hill, Emu, Vol. XII., p. 256, 1913 (N.T.).

Cuculus albostrigatus Vigors and Horsfield, Trans. Linn. Soc., (Lond.), Vol. XV., p. 298, 1827 : New South Wales.

Chalcites simplex Lesson, Echo du Monde Savant, 11th Year, No. 48, June 20, 1844, col. 1138 : New South Wales.

Cacomantis inornatus Bonaparte, Consp. Gen. Av., Vol. I., p. 103, 1850.

Cacomantis cinereus Bonaparte, Consp. Vol. Zygod., p. 6, 1854.

Heteroscenes pallidus Cabanis and Heine, Mus. Hein., Vol. IV., p. 26, 1862 ; Mathews, List Birds Austr., p. 154, 1913 ; S. A. White, South Austr. Ornith., Vol. II., p. 7, 1915 ; [General] *ib.*, Vol. III., p. 129, 1918.

Heteroscenes occidentalis Cabanis and Heine, Mus. Hein., Vol. IV., p. 27, note, 1862 : West Australia.

Cuculus pallidus Schlegel, Mus. Pays-Bas Cuculi, Vol. 1. p. 26, 1864 ; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 261, 1891 ; A. G. Campbell, Victorian Naturalist, Vol. XIV., p. 58, 1897 ; Hall, Key Birds Austr., p. 58, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 564, 1901 ; Hall, Emu, Vol. I., p. 111, 1902 (N.W.A.) ; A. G. Campbell,

THE BIRDS OF AUSTRALIA.

- ib.*, Vol. II., p. 16, 1902 (Vic.); M'Clymont, *ib.*, p. 22 (Tas.); Milligan, *ib.*, p. 172, 1903 (W.A.); Carter, *ib.*, Vol. III., p. 96, 1903 (M-W.A.); Littler, *ib.*, p. 215, 1904 (Tas.); Lawson, *ib.*, Vol. IV., p. 136, 1905 (W.A.); M'Clymont, *ib.*, p. 176 (Tas.); North, *Ibis*, 1906, p. 55; Berney, *Emu*, Vol. VI., p. 44, 1906 (N.Q.); Batey, *ib.*, Vol. VII., p. 11, 1907 (Vic.); G. F. Hill, *ib.*, p. 21 (Vic.); Whitlock, *ib.*, Vol. VIII., p. 191, 1909 (W.A.); Gibson, *ib.*, Vol. IX., p. 76, 1909 (S.W.A.); Littler, *Handb. Birds Tasm.*, p. 81, 1910; Wilson, *Emu*, Vol. XII., p. 32, 1912 (Vic.); S. A. White, *ib.*, Vol. XIII., p. 24, 1913 (S.A.); Macgillivray, *ib.*, p. 162, 1914 (N.Q.). Barnard, *ib.*, p. 207, 1914; *id.* Vol. XIV., p. 43, 1914; Cheney, *ib.*, p. 207, 1915.
- Cacomantis pallidus* Gould, *Handb. Birds Austr.*, Vol. I., p. 615, 1865; Broadbent, *Emu*, Vol. X., p. 239, 1910 (N.Q.).
- Cuculus variegatus* Hartert, *Nov. Zool.*, Vol. XII., p. 217, 1905 (N.W.A.); Ingram, *Ibis*, 1907, p. 402 (N.T.).
- Cuculus pallidus pallidus* Mathews, *Nov. Zool.*, Vol. XVIII., p. 293, 1912.
- Cuculus pallidus occidentalis* Mathews, *ib.*
- Heteroscenes pallidus pallidus* Mathews, *List Birds Austr.*, p. 154, 1913; S. A. White, *Emu*, Vol. XIV., p. 187, 1915 (Centr. A.)
- Heteroscenes pallidus occidentalis* Mathews, *List Birds Austr.*, p. 154, 1913.
- Heteroscenes pallidus tasmanicus* Mathews, *Austral Av. Rec.*, Vol. III., p. 58, Apl. 7, 1916: Tasmania.

DISTRIBUTION: Australia; Tasmania.

Adult male. General colour of the upper-surface greyish-brown, more or less intermixed with white, including the head, back, wings, and tail; ear-coverts and sides of neck similar to the hind-neck; sides of crown grey; base of feathers on the occiput white, which forms a concealed white spot; base of feathers on the back silky ash-grey; the webs of the upper tail-coverts disintegrated with more or less white on the margins, the shafts somewhat darker and contrasting with the rest of the feathers; lesser upper wing-coverts similar but somewhat darker than the back as are also the bastard-wing and primary-coverts; median and greater upper wing-coverts, secondary flight-quills and some of the inner primaries have pale margins to the feathers; inner-webs of primary-quills largely toothed with white, much less pronounced and restricted to the base on the secondaries; tail bronze-brown, the feathers notched with white and shaded with dark brown on both webs, a few of the feathers have a white mark on the shafts near the tips; under-surface ash-grey with a slight tinge of buff in the throat and breast and rather more pronounced on the under wing-coverts, which are obscurely barred with grey; lower flanks and thighs faintly barred with grey and white; under tail-coverts dull white—the long ones narrowly barred with brown; outer edge of wing buffy-white, under-surface of quills pale brown barred with white; lower aspect of tail brown barred, toothed, and tipped with white. Eyes brown; eyelids yellow; feet greenish-grey; bill horn. Total length 340 mm.; culmen 20, wing 201, tail 175, tarsus 21. Figured. Collected at Olinda, Victoria, on the 12th of October, 1912.

Adult female. Differs in having the mark below and behind the eye darker; head darker and marked with buff. Under-surface indistinctly mottled.

Immature. General colour of the upper-surface brown, the feathers broadly margined with white, or smoke-white more broadly on the head, hind-neck, scapulars, and upper wing-coverts; bastard-wing and primary-coverts dark brown tipped with

PALLID CUCKOO.

creamy-white ; flight-quills pale brown margined, notched, or barred with white or buffy-white ; lower back white with dark elongated shaft-streaks to the feathers ; upper tail-coverts brown with white disintegrated margins and white spots to the feathers ; tail dark brown with white notches, white bars, and the outer ones with white tips to the feathers, also white shafts near the tips ; fore part of head, sides of the neck, face, throat, and upper-breast dusky-brown with whitish margins to some of the feathers, particularly on the throat, sides of neck, and upper-breast ; lower-breast, abdomen, axillaries, and under tail-coverts dull white, the feathers marked more or less with brown, especially on the lower-breast, where they are elongated streaks and take the form of grey bars on the axillaries ; under wing-coverts creamy-white with dark spots and grey bars on the long series ; quills below pale brown, barred with white ; lower aspect of tail dark brown notched and barred with white. Figured. Collected at Selby, Victoria, on the 26th of December, 1911. And is almost identical with the Watling drawing, which is the type of *Columba pallida* Latham. And is especially figured for this reason.

Fledgling. Upper-surface sandy-buff, the feathers centred with black arrow-head markings ; wings and tail-feathers dark brown fringed or tipped with white ; fore-head and throat dark brown or blackish ; remainder of the under-surface white streaked with dark brown.

Egg. Pale pink, with few specks. 23-25 mm. by 17.

Breeding-season. August to December or January.

THE early history of this species is mostly concerned with the confusion surrounding the scientific name, so much that it seems best to deal with it in connection with the systematic portion of my account.

In his folio work, Gould figured it under the name *Cuculus inornatus*, which had been given to it by Vigors and Horsfield, who wrote : " Mr. Caley marks the two birds described above as male and female of the same species, and we have accordingly given them as such. 'The earliest period of the year,' he remarks in his Notes, 'at which I have met with this species at Parramatta, was September 6th, 1803. I have missed it in January. It may be frequently heard and seen on the tops of dead trees on the skirts of the woods, and such as have been left standing on the cleared ground.' Without comment they described *Cuculus albostrigatus*, which is the immature plumage of the same species.

Gould's account is quite full and covers most of the notes concerning its habits, so that it is here reproduced : " The southern portion of Australia generally, and the island of Tasmania, are inhabited by this species of Cuckoo ; to the latter country, however, it is only a summer visitant, and a partial migration also takes place in the adjacent portion of the continent, as is shown by its numbers being much fewer during winter. It arrives in Tasmania in the month of September, and departs northward in February. During the vernal season it is an animated and querulous bird, and may then be seen either singly, or two or more males engaged in chasing each other from tree

THE BIRDS OF AUSTRALIA.

to tree. Its ringing whistling call, which consists of a succession of running notes, the last and highest of which are several times rapidly repeated, is often uttered while the bird is at rest among the branches, and also occasionally while on the wing. Its food consists of caterpillars, *Phasmidæ*, and coleopterous insects, which are generally procured among the leafy branches of the trees, and in searching for which it displays considerable activity and great power of traversing the smaller limbs. When desirous of repose after feeding, it perches on the topmost dead branches of the trees, on the posts and rails of the fences, or any other prominent site whence it can survey all around. Its flight is straight and rapid, and not unlike that of *Cuculus canorus*. In respect of its reproduction it is strictly parasitic, devolving the task of incubation on the smaller birds, many species of which are known to be the foster-parents; among them may be enumerated the various *Melithrepti*, *Ptilotes*, *Maluri*, *Acanthizæ*, etc. After the young Cuckoo has left its nest, it selects some low dead branch in an open glade of the forest as a convenient situation for its various foster-parents to supply it with food, for the procuring and supplying of which the smaller birds appear to have entered into a mutual compact."

Barrett, in the *Emu*, Vol. V., p. 20, 1905, gave some very good "Cuckoo Notes" dealing with the general characteristics of ejection, etc., and this may be quoted as typical of the results achieved, of which so much has been written: "In early September the melancholy notes of the Pallid Cuckoo (*Cuculus pallidus*) were heard among the multitudinous bird voices of the valley. During the month, individuals arrived in increasing numbers, and were evidently searching for suitable nests in which to deposit their eggs, for a day seldom passed now without a Cuckoo being seen darting through the trees hotly pursued by a mob of small birds (Wrens, Honey-eaters, Tits, etc.). While watching one of these chases the question arose, are these birds pursuing the Cuckoo because they are really conscious of its intention to shirk parental cares by leaving its egg in one of their nests, or do they mistake it for some bird of prey? If the former be the case, why do birds whose nests have been wronged, remain apparently ignorant of the nature of the alien egg; and when the young Cuckoo is hatched and has murdered its foster-brethren, why do they guard and feed the parasite with as much solicitude as they would their own offspring had these survived? This is certainly a difficult question, and to complicate the problem we found several nests containing only addled Cuckoo's eggs, which would lead one to suppose that the owners of the nests had detected the imposition and abandoned their homes Being anxious to obtain photographs of the early life of the young Cuckoo a nest was kept under close

PALLID CUCKOO.

observation on visiting the nest one morning we beheld a blind and naked nestling, easily recognised by its larger size as the Cuckoo, in the act of ejecting one of its foster-brothers from the nest. The Cuckoo we judged to be about thirty hours old, while the young Wrens had probably been hatched a few hours earlier. We were able to secure a good picture of the young murderer at work, because on one of the Wrens being replaced in the nest, the Cuckoo at once proceeded to throw it out again, with the result that, during the two hours of our watching, he accomplished this feat no less than six times. Struggling desperately until it succeeded in getting the feebly resisting Wren into the hollow of its back, and balancing it there with extended embryo wings, the young Cuckoo, with head bowed between its strong legs, which, with claws firmly fixed in the sides, were straddled across the nest worked its way gradually to the entrance, and on this being reached, suddenly raised the head and with a sharp upward lift of the body pushed the unfortunate nestling over the edge. His work accomplished, the young usurper gave a final shrug of the body, as if to make certain his burden was gone, and subsided exhausted to the bottom of the nest. It has been suggested that the chief factor which operates on the young Cuckoo, and causes it to throw out its foster-brethren, is probably involuntary muscular action, incident on local irritation of the nerves of the skin when in contact with a naked nestling. I scarcely think the facts warrant us in accepting this theory without some reservation; for, if it has much in its favour, it still leaves unexplained a most important point, viz., the reason why a distinct hollow should be present in the back of a Cuckoo during the nestling period, and disappear in the adult bird, if not specially adapted by natural selection for the function it so admirably performs. Again, no one who has not actually witnessed the scene can realise the deliberate and apparently reasoning manner in which a young Cuckoo commits his crimes. Cuckoo nestlings are very voracious. I have often watched them being fed, and found it no uncommon thing for the devoted little foster-parents to make over thirty visits within an hour to the nest with food for their charge. The menu is varied, but the larvæ of lepidopterous insects form an important item, as far as my observations go. The young bird develops rapidly on this diet, and the nest soon becoming too small for his increasing girth, expands to nearly twice its original size, and even then is filled to bursting point. The Cuckoo is fed by the foster-parents long after it has quitted the nest, in the vicinity of which it remains for some time, its plaintive cry for food being always responded to by its anxious guardians. While in the nest the Cuckoo displays a viciousness in keeping with its general character, for if one's finger be placed within reach it will be fiercely pecked until withdrawn."

THE BIRDS OF AUSTRALIA.

F. E. Howe (*Emu*, Vol. V., p. 35, 1905) states: "On two occasions I have seen the Cuckoos visit the nest where their young was. Once at Whittlesea (Christmas, 1902), I found a nest of *A. chrysorrhoa* and in it a young Cuckoo, and while there the parent bird came to the nest and fed the young one; meanwhile, the foster-parents were in a great state of excitement, and repeatedly dashed at her until she left the vicinity."

In the same volume, p. 209, Brent records an instance of two pairs of Honey-eaters (different species) feeding one young Cuckoo.

Barrett further contributed to the next volume, p. 55, 1906, another good general article on "The Origin and Development of Parasitical Habits in the *Cuculidæ*," dealing with general theories on the subject by various workers, chiefly extra-limital and in connection with genera foreign to Australia. I must refer my readers to these articles, as I cannot quote all in this place, and must also draw attention to the fact that in the synonymy of the Cuckoos I have omitted scores of references to short items dealing with foster-parents, etc., of which so many appear in the volumes of the *Emu*, etc., and are of more or less local interest.

From the *South Australian Ornithologist*, Vol. III., pt. 5, p. 131, I take the following: "When on the wing they utter a harsh discordant scream; but when perched the note is very different. . . . It is said that the whistling note is sometimes uttered when on the wing. . . . When uttering the whistling note, the male sits with the head up and the wing drooped; this note is not made by the female, but both sexes have the harsh flight call. The whistling call is uttered at night, more commonly on moonlight nights; but also when quite dark."

In this same journal it is said the difference between the male and female was first pointed out in an earlier part of the work. But I did this in the *Austral Avian Record* in January, 1912, some two years before the said journal was started.

Mr. Edwin Ashby's notes read: "The Pallid Cuckoo is very common in South Australia. It is migratory, reaching our Blackwood district in July. This year, 1917, it was first heard in the first week of July. On its first arrival the 'hoarse call' is much more frequently heard than is the well-known melancholy whistle. The whistle is a running series of eight to twelve notes, of which the first and last are usually repeated several times, the whole covering about six semitones in an ascending scale. Its flight is, in common with most Cuckoos, an undulating one, due to a habit of closing the wings after a series of rapid beats which causes a corresponding drop, thus producing the undulating effect. These birds are fairly numerous throughout this State until well into the summer. Their departure is a gradual one, so that it is difficult to assign any date to the outward migration. In the neighbourhood of Mt. Dandenong, in Victoria, I found this species very numerous in October, 1914, though by no means equal in

PALLID CUCKOO.

numbers to the Fan-tailed Cuckoo. The female is speckled white and black, very similar to the immature state, though usually showing more or less rufous, more pronounced on the neck, though in the case of a female I received from Leigh's Creek, South Australia, Oct. 20, 1910, the breast shows more rufous than the neck. I have a male and female obtained by Mr. C. E. May, at Pine Creek, Northern Territory, which appear to be mature birds, but show a considerable speckling of white on the wings and a decided barring on both lower breast and flanks and yet show none of the streaky markings of the South Australian immature or female specimens."

Littler, of Tasmania, recorded (*Emu*, Vol. III., p. 215, 1904): "I have never before seen so many birds of one species in such a small area. No two birds were seen together; each bird seemed perfectly oblivious of the existence of any other member of the same species. Some of the birds were heard uttering their low, plaintive notes, while others were quite silent. Their flight is peculiar. When disturbed they fly with easy motion close to the ground for some yards, then, when close to the object upon which they are going to perch, they rise up almost perpendicularly on to it. The tail is jerked up and down, when perching, rather slowly. They appeared to obtain most of their food from off the ground."

Mr. Thos. Austin has given me the following good note: "The Pallid Cuckoo is never seen here in anything like such numbers as near the coast, but every spring a few of them are to be seen scattered about the more open country and even into the thick scrubs. It is generally met with singly, but I find that during the breeding-season they are mostly in pairs, though they do not keep closely in each other's company like many other mated species. At these times they are mostly heard calling about two hours after sunrise, most probably as soon as their appetites have been satisfied. But their monotonous mournful notes may be heard at any time, either day or night. Once a pair have mated they take up their quarters about a limited area of country, and there they will remain until the breeding-season is finished. Should another bird of this species come within the bounds of that limited area, the mated pair will do their utmost to, at once, drive it away, chasing it from tree to tree, with loud shrieking notes, such as are not heard at any other time. Most of them arrive here early in September, and take their departure towards the end of February. A few come much earlier (as my notes will prove) and some remain until the end of March. Their food chiefly consists of caterpillars if available, which they do not swallow upon the ground, but always fly into a tree, on to a fence or such-like perch, where they slowly devour their food. Very few of them breed here (Cobbora, New South Wales), but I have known them to place their eggs in nests of the following species in this district, White-plumed, Brown-headed, Warty-faced, and White-eared Honey-eaters, also Rufous-breasted Thickheads. In my oological

THE BIRDS OF AUSTRALIA.

collection I have their eggs taken with forty species of foster-parents. The earliest date I have taken their eggs was on August 23rd, 1909, in a nest of the Brown-headed Honey-eater, and the latest November 17th, 1909, in a nest of the White-plumed Honey-eater."

Berney, in the *Emu*, Vol. VI., p. 44, 1906, states: "At one time or another the Pallid Cuckoo is to be found here (Richmond district, North Queensland) during all the seasons of the year; though undoubtedly migratory, it is hard to form any opinion as to just what is the order of its coming and its going, so irregular are its movements."

Captain S. A. White has written me: "*Heteroscenes pallidus* is a very early spring visitor to the Adelaide plains: often in July their strange scale-like note is heard; they are more numerous during good seasons and are not seen during droughts; they will fly from one dead tree top to another or from fencing post to fencing post uttering their mournful cry. When they alight they invariably have their long tails at almost right angles to their bodies and slowly let it fall. Small birds of many species mob them from place to place; foster-parents for their young are Honey-eaters, sometimes *Melithreptus gularis*, but more often *Meliphaga sonora*, the latter bird's eggs being very like those of the Cuckoo. My wife and I met with these birds in great numbers at the head of Eyre's Peninsula in 1912 migrating to the south. We also found the bird right though Central Australia."

Mr. J. W. Mellor's notes confirm the above in their entirety; while F. E. Howe adds: "Appears at Ringwood, Victoria, during September, and commences to live a lively existence, continually chasing one another or being pursued by every other bird it meets. Their eggs have been noticed in the nests of *Rhipidura tricolor*, *R. albiscapa* and *Pachycephala rufiventris*, but they are more partial to those of the Honey-eaters. I have never noticed an egg in a domed nest."

Mr. H. S. Dove has sent me the following about the calls of this species: "Oct. 21, 1911. A pair of Pallid Cuckoos apparently just arriving (in Tasmania) from over the Straits, soon after seven o'clock on a sunny morning, with a light southerly breeze (the birds came from the north). One alighted on a gum-tree on the Parade, and gave the usual call, running up the scale, the other settled on a lower limb, and called 'Pweee!' The first flew down, when the other immediately left, flying strongly to the south (inland). During the afternoon of the same day, a fine bird was seen near the nest of a White-fronted Chat, calling 'Twit! twit, twit, twit,' and occasionally, 'Pho-wee,' a fine rich call, somewhat like the 'Pweee!' heard this morning, but rounder and richer. November 19th. Fine Pallid Cuckoo sitting on garden fence, squatting low with legs concealed, as usual with this species:

PALLID CUCKOO.

this one was apparently a female, from the beautiful mottling of the wings in dark and light greys ; there was a broad curved whitish stripe over the eyes. Next day a similarly coloured bird, but looking rather smaller, was giving its series of loud crescendo notes (‘ running up the scale ’) in the morning at 6 a.m. The same individual appears to make the other call, ‘ Twit-twit-twit-twit,’ or ‘ Wit-wit-wit-wit,’ which is often heard now, also a reedy ‘ Pe-aw ! ’ ”

Macgillivray recorded in the *Emu*, Vol. XIII., p. 162, 1914 : “ A young fully-fledged specimen was obtained at Sedan on 15th February, 1910. It was being fed by a pair of Red-throated Honey-eaters (*Conopophila rufogularis*). The colouring of the soft parts of this young bird was : Irides light stone colour, legs and feet leaden. Stomach contents, large grasshoppers and portions of beetles. On the 16th February another young bird was seen being fed by a pair of Yellow-throated Miners (*M. flavigala*) : it was a much older bird than the first, but the colouring of the soft parts was the same. It is interesting to note that both the small Red-throated Honey-eater and the larger Miner, fed these young Cuckoos on the usual food of the Cuckoo family, and not on their own. Even the larger foster-parents rarely eat such large insects. This species was not noted at Cape York, though common in the Gulf.”

When I reviewed the species I concluded it did not move far, and since observers have allowed that the species is more or less resident. A. G. Campbell (*Emu*, Vol. II., p. 16, 1902) observed : “ Whether the Pallid Cuckoo (*Cuculus pallidus*) remains during the winter (in north-eastern Victoria) is doubtful. However, a bird was seen during the second week in June, 1899, and the first whistle heard on 1st July.” Milligan, in the same place (p. 172), recorded them on the other side of the continent, the first arrival was noted at Perth, Western Australia, on 5th July, following some heavy gales.

Detailed observations should be made for a series of years in one locality and the results attained will probably lead to a better knowledge of this species than there is at present.

McClymont in the *Emu*, Vol. II., p. 22, 1902, wrote : “ One day in September last I noticed a small bird—I was too far off to recognise the species—fluttering about in front of a Pallid Cuckoo (*C. pallidus*) perched on a fence. Its movements resembled those of a bird struggling to free itself from a noose in which its feet were entangled. The fluttering continued for several minutes until the Cuckoo flew away. On another day (20th October) a Yellow-throated Honey-eater (*Ptilotis flavigularis*) was observed flitting hurriedly from perch to perch before a Pallid Cuckoo near the same spot. In one of its hurried flights it grazed the Cuckoo’s head, causing the latter to flinch slightly, and this was the only movement on the part of the Cuckoo on either occasion. This

THE BIRDS OF AUSTRALIA.

went on for four or five minutes until the Honey-eater flew away. What meant the strange agitation of the two non-parasitical birds, the almost absolute passivity of the other? The true solution would be interesting. Mere playfulness on the part of the smaller birds, and a love of teasing the intruder, may be the explanation. Much forethought and ingenuity are involved in the selection of a suitable nest and of the right foster-parent for its young; and these qualities, I think, save the Cuckoos from any charge of stupidity or maternal incapacity. There are several points of interest in connection with these birds which are worthy of close observation. I venture to mention a few of them: (1) Migratory range of the various species. (2) Complete lists of nests appropriated by each species. (3) Whether other birds, either singly or collectively, drive the Cuckoo from their nests. (4) Whether the young birds consort with and accompany their parents or otherwise. (5) Whether the Cuckoo's egg is laid in the nest of the foster-parent or otherwise.

Item No. 1 is the most important and least understood at the present time and certainly needs close attention; the second has been answered by H. L. White as quoted herein; the third needs consideration as regards Australian forms; the fourth seems to be answered in the negative as far as records go, no one appearing to have noted the affirmative; while as to the fifth, the egg appears to be generally NOT laid in the nest of the foster-parent.

C. F. Cole, in the *Emu*, Vol. VIII., p. 23, 1908, recorded some observations on the Finch as foster-parent to the Cuckoo, which cannot be detailed in full but which tended to show that the Cuckoo cannot be reared by a Finch as the food disagrees so that the young Cuckoo was found dead, mainly of starvation. A note regarding the ejection reads so clearly that it is worth quoting: "I found a Finch's nest situated low down in a pear-tree in the orchard and containing three Finch's eggs and a Pallid Cuckoo's. On examining them I came to the conclusion that they would soon be hatched. This surmise proved to be correct. On the fourth day from finding the nest, at noon, all four young birds had hatched. I knew that the Cuckoo would eventually get rid of his nest companions, either by ejecting them—the commoner method in vogue amongst these strange birds—or else by trampling them to death. This trampling to death business, as far as my observations go, is that the Cuckoo finds it easier work to get rid of the stronger than the weaker nestlings, my reasons being these: Young birds in the nest always strive for the top position, which naturally falls to the stronger. With the young Cuckoos it is the reverse: they work to get beneath, and as a rule there is no trouble, the other young birds readily making way, thus playing into the hands of their murderous nest mate, who getting them into the hollow between its shoulders, easily casts them out to destruction. I have on rare occasions found the

PALLID CUCKOO.

Cuckoo to quickly sit upon and by its greater strength smother and crush the life out of weaker or sickly nestlings. One can easily prove how readily the young birds in a nest make way by simply placing the finger in the nest and gently working it downwards beneath them, this action at once causing them to make for the uppermost position. The second day from hatching the Cuckoo had got rid of its three nest companions; their carcasses I found upon the ground. The Cuckoo up till this stage looked both well and strong . . . at the end of the third day (it) looked seedy, and upon looking into the nest on the morning of the fourth day, I found it dead. Upon dissecting this young Cuckoo I found the organs in a wasted condition and the body devoid of any fatty substance, proving beyond doubt that death was due to starvation."

Mr. Tom Carter has furnished me with his notes made in the west: "The Pallid Cuckoo is found in West Australia from the north-west to the south-west. In the mid-west they made their appearance with winter rains, from April to July. Their peculiar, monotonous cry is uttered both by day and night. A fledged young bird was shot near Point Cloates, Nov. 15, 1900. At Broome Hill in the south-west they begin to appear about the middle of April and become very numerous; the bulk of them leave in the middle of October, but occasional birds have been seen and heard calling until December 23rd. Arrivals noted: May 25, 1905, July 26, 1906, May 22, 1907, July 14, 1908, April 20, 1910, May 4, 1911 and July 15, 1912. Last dates noted: Dec. 23, 1907. The bulk had gone by Oct. 10, 1907. In 1910 nearly all Pallid Cuckoos left by Oct. 19: odd ones seen to December: one heard calling at Albany, Dec. 29, 1911. Young birds seem to fledge out about Broome Hill in November and December: Dec. 23, 1907. Fledgling noted, also Nov. 27, 1910, and two or three more Dec. 6, 1911. On Dec. 16, 1902 two fledglings were observed on the Vasse River, south-west: one of them was being fed by *Melithreptes chloropsis* and the other by *Ptilotis sonora*. About Broome Hill nests of *Ptilotis sonora* seemed to be the favourite ones for these Cuckoos to deposit their eggs."

Mr. J. P. Rogers wrote from North-west Australia: "March 16, 1909. Are numerous at present. March 23, 1909. Seven seen to-day. April 24, 1909. None seen since the 10th of April. May 2, 1909. One seen at the bend of the Ord River, thirty miles S. of Wyndham. May 16, 1909. Wild Dog, 170 miles S. of Wyndham. None seen since 2nd. May 29, 1909. Two seen to-day at Flora Valley Station about 290 miles S. of Wyndham, at the headwaters of the Ord River: altitude approximately 900 feet. June 10, 1909. Several seen at Mary River about 290 miles S. of Wyndham, elevation about 1,100 ft. . . . At Marngle Creek these were fairly numerous, a few being seen every day, usually in timber near the edge of the plains.

THE BIRDS OF AUSTRALIA.

At Mungi I only saw one of these birds, but they are very numerous in the wet season in Kimberley. At Melville Island only two birds seen, on Jan. 13, 1912, the other, an immature, the next day."

In the *Ibis*, 1917, pp. 186-223, Meiklejohn has furnished "Some Reflections on the Breeding-habits of the Cuckoo (*Cuculus canorus*)." These were based more or less on the results given by a German observer Dr. Eugene Rey, after many years' consideration, and the conclusions read :

- "1. The Cuckoo is probably polygamous.
2. The eggs vary more in colour and markings than those of any known (*Palæarctic*) species.
3. Their main distinctive features are the comparatively greater weight, thickness and strength of shell.
4. Most Cuckoos' eggs resemble the normal type of those of a certain number of the species which are usually selected as foster-parents ; resembling the *general type* some 45 per cent.
7. The explanation is probably that the nest is selected *after the egg is laid*.
8. The prevalence of certain distincture types of eggs in certain localities can be assigned to the law of adaptation.
9. Most female Cuckoos return to the same locality as that in which they were themselves reared.
11. The number of eggs laid yearly is probably nine to twelve.
12. Laying appears to take place at irregular intervals.
15. Each female lays eggs of the same type all her life.
16. The eggs are probably laid on the ground amongst vegetation or the forks of trees.
17. Only one egg is placed in any nest, and if two or more are found in the same nest they belong to different females.
18. When placing its egg in a nest the Cuckoo usually removes one or more of those of the foster-parent.
19. At times a vigorous resistance is met with from the owners of the nest, resulting in the Cuckoo's eggs being destroyed.
22. Shortly after being hatched the young Cuckoo ejects all its companions from the nest.
23. The female Cuckoo, appears, at least at times, to take some interest in the future development of her eggs—assisting on occasions in the process of ejection and even in feeding her young."

The results modify those arrived at by Link and summarised in the *Emu*, Vol. V., p. 93, 1905, and well show the difficulty of gaining accurate knowledge of the exact habits of a peculiar bird like the Cuckoo.

PALLID CUCKOO.

It is probable that the above obtained from the Palæarctic *Cuculus* do not absolutely apply to Australian Cuckoos and, moreover, that the peculiar habits of the different Australian genera, *Heteroscenes*, *Cacomantis*, *Owenavis*, *Lamprococyx*, *Neochalcites* disagree. So far most Australian ornithologists have lumped their observations, so that it is to be hoped some one will undertake the careful discrimination of the known facts in connection with the different groups. Thus in the *Emu*, Vol. V., p. 145, 1906, Mattingley gave notes on principles governing movement in Cuckoos and migration in birds, and apparently furnished a complete paper to the Ninth Session of the Australasian Ornithologists' Union at Adelaide which does not appear to have been printed, the official account (*Emu*, Vol. IX., p. 110, 1910) reading : " A valuable paper was then read by Mr. A. H. E. Mattingley, C.M.Z.S., etc., on 'Cuckoos.' It has been contended, he said, that Cuckoos select suitable foster-parents and with diabolical cunning place their eggs in nests of other birds whose eggs harmonise in colour with those laid by the Cuckoo. The statistical data obtained by me, the careful comparison of which has taken me several months to prepare, shows that these haphazard statements have no foundation whatever in fact. Only an infinitesimal percentage of Cuckoo eggs closely approximate the colour, shape, markings and size of those of their foster-parents. Then, again, instances are fairly numerous in which the Cuckoo, an insectivorous bird, places its eggs in the nests of graminivorous birds, with the result that the young Cuckoos, after being hatched out, invariably die for want of proper nourishment, due to the lack of insect food, so necessary in their rearing, and which is not supplied them by their grain-eating foster-parents. The placing of their eggs in the nests of graminivorous birds by Cuckoos shows that their so-called instinct is either at fault or not present. Then, again, we have Cuckoos placing their eggs in the nests of other birds already containing Cuckoo's eggs. Had the Cuckoo the knowledge, instinctive or otherwise, of the habit possessed by its young ones of ejecting any other occupant of the nest, be it eggs or young foster-brethren, it would most assuredly have placed its eggs in the nest of some other bird devoid of eggs of the Cuckoo tribe, so as to enable its offspring to survive. Then again, the size of the bird and the colour of plumage of the foster-parents selected is in most cases disproportionate. The type of nest, too, selected by the same species of Cuckoo varies considerably. Most of the Cuckoos also place their eggs in nests that are much too small for their offspring when it has grown to a size ready to fly away. The comfort of their offspring is apparently not considered by Cuckoos. In not a single authentic case have I been able to trace the peculiar habits that Cuckoos possess of foisting the incubation of their eggs on to other species of birds, as well as the feeding and rearing of their young afterwards,

THE BIRDS OF AUSTRALIA.

to an instinctive habit. We are led to believe that instincts, so-called, are never-erring, but with the Cuckoos their methods are haphazard and full of error, hence one cannot attribute the peculiarities surrounding the nidification of Cuckoos as due to never-erring instincts. The mass of statistical data in my paper will once and for all time, I hope, settle the vexed question, generally accepted by casual observers, that Cuckoos select the nests of foster-parents in which to place their eggs that lay similar eggs to their own—that is, so far as Australian Cuckoos are concerned.”

Had the statistics been published we might have been able to dissect them, so that probably different results might have been shown according to the different genera of the Cuckoos. Thus the extreme variation in the coloration of the eggs as applied to the European Cuckoo cannot be utilised in the genus *Lamprococcyx*, and while it might be true that the resemblance reached as high a percentage as 45 per cent. in the former, the infinitesimal percentage of Mattingley would be true of the latter: and as to the other points the like comment applies.

In the *Emu*, Vol. XIV., p. 144, 1915, H. L. White stated clearly, without statistical data, conclusions which appeal to me and which seem confirmatory of the European results in plain language: “For more than thirty years Cuckoo’s eggs have had a great attraction for me, and upon every possible occasion I have tried to add to my collection, which I now look upon as fairly complete, though there will always be what I call chance combinations to be added. It is evident to anyone who has given the matter a close study that the various species of Cuckoos have their favourite foster-parents, and that these are not very numerous; outside of these favourites are what I term ‘chance’ or perhaps more properly, ‘occasional,’ foster-parents, which are used now or then. There is no doubt in my mind that Australian Cuckoos which lay in open nests usually select as foster-parents those birds whose eggs nearly approach their own in coloration. A casual glance at my collection gives the impression that my theory is incorrect, as one’s gaze is met by many colours that do not harmonise, however uniform the general appearance may be. A visitor often exclaims, ‘Oh, look here! and here! and here! these differ altogether.’ ‘Quite so,’ I admit, ‘but please to remember that those you point out are occasional combinations only. Examine these dozen combinations of “favourites,” forming perhaps 90 per cent. of the foster-parents used by this particular Cuckoo. Do not they harmonise?’ The answer is invariably, ‘Yes, of course they do!’ Taking the species of foster-parent as a whole, say those used by the Pallid Cuckoo (*Cuculus pallidus*), in 100 species, it will probably be found that sixty of them do not harmonise. This does not disprove my theory in the proportion of six to four; it simply proves

PALLID CUCKOO.

that I have been to very great trouble in collecting sixty 'occasionals,' while all the time the forty contain favourites which are used in ninety out of 100 cases. Scientists say that I am wrong, and that I cannot prove my case. Well, perhaps I cannot to their satisfaction, but there can be no harm in giving the result of my experience and observation, as quoted above."

With regard to foster-parents, H. L. White has given a complete list in the *Emu*, Vol. XIV., p. 146-8, 1915, and after consideration I here give the specific names as recorded by him, the subspecies being omitted. These are: *Microeca fascinans*, *Petroica multicolor*, *Littlera chrysoptera*, *Whiteornis goodenovii*, *Melanodryas cucullata*, *Amaurodryas vittata*, *Ethelornis magnirostris*, *Rhipidura flabellifera*, *Howeavis rufifrons*, *Leucocirca tricolor*, *Myiagra rubecula*, *M. nitida*, *Sisura inquieta*, *Coracina novæhollandiæ*, *Lalage tricolor*, *Morganornis superciliosus*, *Calamanthus fuliginosus*, *C. campestris*, *Epthianura albifrons*, *Conopoderas australis*, *Acanthiza pusilla*, *Sericornis longirostris*, *Tasmanornis humilis*, *Malurus cyaneus*, *Ryania melanocephala*, *Stipiturus malachurus*, *Artamus leucorhynchus*, *Campbellornis superciliosus*, *C. personatus*, *Austrartamus melanops*, *Pseudartamus cyanopterus*, *Micrartamus minor*, *Coluricincla harmonica*, *Bowyeria boweri*, *Grallina cyanoleuca*, *Falcunculus frontatus*, *Oreoica cristata*, *Pachycephala pectoralis*, *Lewinornis rufiventris*, *Gilbertornis rufogularis*, *Timixos olivaceus*, *Eopsaltria australis*, *Neositta chrysoptera*, *Climacteris leucophæa*, *Melithreptus lunatus*, *M. gularis*, *M. validirostris*, *M. atricapillus*, *M. affinis*, *Plectorhyncha lanceolata*, *Acanthorhynchus tenuirostris*, *Gliciphila melanops*, *Ramsayornis fasciatus*, *Zanthomiza phrygia*, *Paraptilotis fusca*, *P. chrysops*, *Meliphaga lewinii*, *M. sonora*, *Nesoptilotis flavicollis*, *N. leucotis*, *Lophoptilotis melanops*, *L. leadbeateri*, *Lichenostomus ornatus*, *L. cratitius*, *L. keartlandi*, *Ptilotula penicillata*, *Broadbentia flava*, *Phylidonyris pyrrhoptera*, *Meliornis novæhollandiæ*, *M. niger*, *Manorina melanophrys*, *Myzantha melanocephala*, *M. flavigula*, *Coleia carunculata*, *Anthochæra chrysoptera*, *Acanthogenys rufogularis*, *Entomyzon cyanotis*, *Neophilemon buceroides*, *Tropidorhynchus corniculatus*, *Anthus australis*, *Mimeta sagittata*, *Sphecotheres maxillaris* and *Dicruropsis bracteatus*.

It will be noted that White referred to a few of these only being the "favourite" foster-parents, the majority being "occasional" foster-parents only. It would be of interest at some time to have the "favourites" for different localities calculated, as these may well vary exactly as is known in the case of the European Cuckoo. Such is suggested in items by various correspondents to the *Emu*, and figures given would assist in fixing these, but the statistics must not be too complex.

The confusion in connection with the specific name of this Cuckoo has now, I hope, been entirely dissipated. When Latham examined the "Watling"

THE BIRDS OF AUSTRALIA.

drawings he noted a strange new bird which he described as *Columba pallida*, the artist having painted the Cuckoo feet incorrectly. The name was therefore unrecognised until 1843, when Gray, Strickland and Gould criticised the drawings in the possession of the Earl of Derby. Gray did not accept the drawing as representing any bird he was familiar with, marking it "*Columba* — ?" but one of the others, Strickland or Gould, recognised the painting as depicting not a Pigeon, but a Cuckoo. The name *pallida* was then used until 1905, when Hartert concluded this was incorrect, basing his conclusion upon the description, and ignorant of the fact that recognition had been made through the recovery of the painting, which had served Latham for his description. He selected *variegatus* of Vieillot as the correct name for the Cuckoo, but this was immediately rejected by North, who considered that also imperfect and desired the acceptance of *inornatus*, the name given by Vigors and Horsfield. When Sharpe recorded the Watling drawings, by a peculiar blunder he determined No. 226 as *Lopholæmus antarcticus* Shaw, observing: "Although this figure is very incorrect, I am inclined to think that it is intended for *Lopholæmus antarcticus*." My own examination of the Watling drawings served to convince me that Gould's acceptance was correct, and I reinstated *pallida* and have used it ever since. In order to make this point clear to the worker who has not access to the original drawings, I had an exact reproduction made and published it in the *Austral Avian Record*, Vol. III., 1915, pt. 1, where I also gave a full account of the history of the name, so that my conclusions could be fairly criticised.

The coloration of the female has now been settled as being different, but it is interesting to note how the mistake arose. Gould noted: "It breeds in this state, and it is doubtful whether in the female it is ever entirely cast off. . . . The female differs . . . all which markings may in very old birds give place to a style of colouring similar to the male."

Subsequently authorities stated that the sexes were alike, apparently considering Gould's suggestion as a feasible one and inaccurately making it into a fact. When I examined my birds in 1911 I found no female that was like the male, so I wrote in the *Austral Avian Record*, Vol. I., p. 10, Jan. 2nd, 1912: "I had assumed, as most other writers have, that the adult female was like the adult male. . . . From my series I can only conclude that the female is *never* absolutely uniform above and below, like the male."

At the same time I wrote to Captain S. A. White on the subject, and he communicated his results to the *South Australian Ornithologist*, Vol. II., p. 7, 1915: "After several years of close observation in districts where this bird is very common, and after handling over thirty birds in the flesh, I can positively

PALLID CUCKOO.

say that there is a vast difference between the sexes in adult plumage. . . . In August and September, 1911, while working over an extended piece of country on Eyre's Peninsula, the Pallid Cuckoo was met with in numbers coming from the north. They were calling all day long in their monotonous series of notes, like the running of the scale; in fact, when there was the slightest moonlight or bright starlight their call was often heard in the silent watches. Each day specimens were collected, and on being dissected were found to be males. Not one female bird was procured during the trip. When passing through the Gawler Ranges in August and September of 1912 we again came upon these birds travelling south in great numbers. The first five specimens were all females, and there seemed to be more of that sex than males. . . . There were no young birds, and every female handled had well-developed ovaries, in many cases within a few hours of being laid. Every one of these females had the rusty-brown and grey-mottled plumage. All males were in their full plumage, and there was little or no variation in their coloration."

Thus confirming my original opinion as in the *Austral Avian Record*, January, 1912.

The subspecies of this Cuckoo have not yet been accurately determined, chiefly through the idea that there could not be subspecies of migratory birds. These birds, however, perform movements which are not yet understood, but scarcely come under the peculiar meaning of migrations. Of course, Gould was not troubled with such details, and wrote: "The specimens of this bird from Western Australia are somewhat smaller, and have the white marks of the tail less distinct than specimens from Tasmania, but these differences are, in my opinion, too trivial to be regarded as other than mere local variations: but MM. Cabanis and Heine think otherwise, and have assigned to them the specific appellation of *occidentalis*."

Upon examining my collection for the preparation of my "Reference List" it was obvious that two races, even as Gould admitted, were recognisable, and therefore I allowed them, using, of course, trinomials for the purpose. I have since named the Tasmanian form, and it is now suggested, as it is agreed that only local movements take place, that many more will be separated. At the present time the Cuckoo is more or less resident in New South Wales, while Dove suggests the Tasmanian form might migrate to that locality. As it is now known that the North Victorian birds are separated by the mountains from those of the south, it is here proposed that the Tasmanian form does not cross the Ranges. Macgillivray points out that it did not occur at Cape York, while it was common in the Gulf country. Its movements in South Australia are somewhat peculiar, so that it probably does not cross Central Australia; and, moreover, the northern and southern parts of West Australia may provide

THE BIRDS OF AUSTRALIA.

different forms. This would give us six subspecies of a "moving but not migratory" Cuckoo resident in Australia, a result probably in agreement with nature but "contrary to preconceived ideas." At the present time specimens are not available for differentiation on these lines, but differences can be seen in specimens which I conclude are individual, whereas they may be geographical.

GENUS—CACOMANTIS.

- CACOMANTIS S. Muller, Verhandl. Gesch. Land en
Volkenk, p. 177, 1843 Type *C. flavus*.
- Gymnopus* Blyth, Ann. Mag. Nat. Hist., Vol. XII., p. 94,
1843 Type *C. passerinus*.
Not of Dumeril, 1835.
- Polyphasia* Blyth, Journ. As. Soc. Bengal, Vol. XII.,
pt. I., p. 244, 1843. Type *C. flavus*.
Not of Stephens, 1829. Illustr. Lepid.
- Ololygon* Cabanis und Heine, Mus. Hein., Vol. IV.,
p. 20, note, 1864 Type *C. passerinus*

THE species referred to this genus, which has been admitted by genus-lumpers, are Cuculine in structure as regards wings, bill, tail and legs, but are of smaller dimensions and different coloration.

The wing is short and the first primary is about half the length of the third, which is longest, the fourth being longer than the second, the second, third and fourth primaries forming the tip.

It is possible that the group even as restricted is not homogeneous, I am therefore separating the species *C. castaneiventris*, on account of the differences observed, as *Vidgenia* gen. nov.

CACOMANTIS RUBRICATUS.

FAN-TAILED CUCKOO.

(PLATE 351.)

Sylvia rubricata Latham, Index Ornith., Suppl., p. lv., 1801 : New South Wales.*Sylvia rubricata* Latham, Index Ornith., Suppl., p. lv., 1801.*Cuculus rufulus* Vieillot, Nouv. Dict. d'Hist. Nat., Vol. VIII., p. 234, 1817 : New South Wales ; Pucheran, Revue Mag. Zool., 1852, p. 560.*Cuculus cineraceus* Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 298, 1827 : New South Wales. ; Jardine and Selby, Illus. Ornith., Vol. II., pt. v., pl. 67, 1829 ; Gould, Birds Austr., pt. xxix. (Vol. IV., pl. 86), 1847.*Cuculus incertus* Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 299, 1827 : New South Wales.*Cacomantis flabelliformis* (nec Latham) Bonaparte, Consp. Gen. Av., Vol. I., p. 104, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 618, 1865 ; Ramsay, Proc. Zool. Soc., 1875, p. 600 ; *id.*, Proc. Linn. Soc., N.S.W., Vol. I., p. 192, 1878 ; *id.*, Tab. List Austr. Birds, p. 15, 1888 ; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 266, 1891 ; Hall, Key Birds Austr., p. 58, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 568, 1901 ; Hall, Emu, Vol. I., p. 111, 1902 (N.W.A.) ; Belcher, *ib.*, p. 124 (Vic.) ; Milligan, *ib.*, Vol. II., p. 74, 1902 (S.W.A.) ; Littler, *ib.*, p. 171, 1903 (Tas.) ; Howe, *ib.*, Vol. V., p. 36, 1905 (Vic.) ; North, Ibis, 1906, p. 53 ; Batey, Emu, Vol. VII., p. 11, 1907 (Vic.) ; G. F. Hill, *ib.*, p. 21 (Vic.) ; Austin, *ib.*, p. 75 (N.S.W.) ; Gibson, *ib.*, Vol. IX., p. 76, 1909 (S.W.A.) ; Broadbent, *ib.*, Vol. X., p. 239, 1910 (N.Q.) ; Littler, Handb. Birds Tasm., p. 84, 1910 ; North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 6, 1911 ; Stone, Emu, Vol. XII., p. 117, 1912 (Vic.) ; Chandler, *ib.*, Vol. XIII., p. 37, 1913 (Vic.) ; Cheney, *ib.*, Vol. XIV., p. 207, 1915 (Vic.) ; Dove, *ib.*, Vol. XVI., p. 109, 1916 (Tas.).*Cacomantis incertus* Bonaparte, Consp. Vol. Zygod., p. 6, 1854.*Cacomantis rufulus* North, Ibis, 1906, p. 53 ; Mathews, Handl. Birds Austral., p. 57, 1908 ; *id.*, Emu, Vol. IX., p. 7, 1909 (N.W.A.) ; Hall, *ib.*, p. 130, 1910 (S.A.) ; Howe, *ib.*, p. 230 (Vic.) ; Wilson, *ib.*, Vol. XII., p. 32, 1912 (Vic.).*Cuculus rubricatus rubricatus* Mathews, Austral Av. Rec., Vol. I., p. 21, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 293, 1912.*Cuculus rubricatus athertoni* Mathews, Austral Av. Rec., Vol. I., p. 11, 1912 : Atherton, North Queensland ; *id.*, Nov. Zool., Vol. XVIII., p. 293, 1912.



H. Grönvold, del.

Witherby & C^o

$\frac{11}{12}$
CACOMANTIS RUBRICATUS.
(FAN-TAILED CUCKOO).

FAN-TAILED CUCKOO.

Cuculus rubricatus albani Mathews, Austral Av. Rec., Vol. I., p. 12, 1912 : Albany, West Australia ; *id.*, Nov. Zool., Vol. XVIII., p. 293, 1912.

Cacomantis rubricatus Mathews, List Birds Austr., p. 155, 1913.

Cacomantis rubricatus rubricatus Mathews, *ib.*

Cacomantis rubricatus athertoni Mathews, *ib.*

Cacomantis rubricatus albani Mathews, *ib.*

DISTRIBUTION. Australia, except North-west and Northern Territory ; Tasmania.

Adult male. General colour above slate-grey including the crown of the head, ear-coverts, cheeks, back, scapulars, and upper tail-coverts, the lateral upper tail-coverts marked with white on the outer webs ; upper wing-coverts and flight-quills bronze-brown glossed with bottle-green and margined with rufous on the major coverts and inner secondaries, outer edge of wing white, some of the primary and secondary quills more or less white on the basal portion of the inner webs ; tail-feathers blue-black tipped and notched with white on both webs, the next pair similar, but the white indentations increased in extent and a longitudinal white mark on the shaft near the tip, the following pair have the white somewhat increased and three white marks, of irregular shape, on the shaft of the apical portion, the penultimate pair have the white pattern increased and four white marks on the shaft and the one nearest the tip is merged into the notch on the inner-web forming an irregular bar, on the outer pair there are six white bars and the white indentations on the outer web are confined to the margins only ; base of fore-head and chin pale ash-grey ; under-surface of body for the most part cinnamon-rufous, paler on the lower flanks where the feathers are mottled with grey which become whitish at the tips ; under tail-coverts, axillaries, and under wing-coverts cinnamon-buff, some of the last more or less barred with grey ; under-surface of quills pale brown with white on some of the inner edges ; lower aspect of tail dark brown barred, notched, and tipped with white. Eyes brown ; orbits gamboge ; feet and tarsus yellow ; bill dark purple with the base yellow. Total length 260 mm. ; culmen 16, wing 138, tail 126, tarsus 17. Figured. Collected at Albany, South-west Australia, on the 15th of May, 1907.

Adult female. Similar to the adult male.

Immature. General colour above russet-brown including the head, back, and upper wing-coverts, the feathers having dark centres gives a more or less barred or scalloped appearance ; edge of wing white ; bastard-wing, primary-coverts, and flight-quills bronze-brown, some of the quills slightly edged with russet-brown and more broadly with white on the inner-webs ; tail dark bronze-brown becoming paler on the lateral feathers, notched and margined with rufous, which breaks into bars on the outer feathers, where the rufous is very pale and inclining to white ; sides of face, throat, fore-neck, and sides of neck pale rufous with white and dusky-brown bars to the feathers ; remainder of the under-surface of the body dusky-brown, the feathers barred and tipped with dull white, becoming much paler on the vent and lower flanks ; under tail-coverts and under wing-coverts washed with pale buff ; under-surface of quills pale brown with white on the inner-webs—chiefly towards the base ; lower aspect of tail dark brown on the central feathers, becoming paler on the outer ones, notched on the middle feathers and barred with buff or white on the lateral ones. Figured. Collected at Olinda, in Victoria, on 1st of December, 1912.

Nestling. Barred with buff and dark brown above and white and dark brown below. Birds able to fly are also marked like this above, but darker. The under-surface is also buff and dark brown instead of white and dark brown.

Egg. Ground-colour dull whitish. Heavily coloured all over with small spots of purplish-brown, with a more or less defined zone at the larger end. 20 to 23 mm. by 14 to 15.

Breeding-season. August to December.

THE BIRDS OF AUSTRALIA.

VIGORS and Horsfield described a Cuckoo as *Cuculus cineraceus*, and followed with *Cuculus incertus*, observing under the latter: "Mr. Caley in his Notes seems to consider this bird as the young of the last species. It differs much in the ground-colour of the upper-parts, and in the fasciæ of the lower; while the spots on the tail are ferruginous instead of being white. These, however, are differences which may be easily supposed to take place in the different stages of growth; our own Cuckoo differs nearly as much in its early and adult ages. But there is one character in which the two birds before us differ, and which is seldom found to vary at different times in the same species; that is, the colour of the under wing-coverts. These are ferruginous in *C. cineraceus*, and white fasciated with fuscous in the bird now before us. We are therefore inclined to keep the birds separate, until future observation in their own country determine the point; expressing at the same time Mr. Caley's and our own doubts on the subject."

Gould's notes are somewhat scanty reading: "This is a migratory species, arriving in Tasmania in September, and after spending the summer months therein, departing to the northward in January and February. In the southern parts of the continent of Australia solitary individuals remain throughout the winter, as evidenced by my having observed it round Adelaide in July; I have never seen individuals from the north coast; I therefore infer that its migratory movements are somewhat restricted; in all probability the 26th degree of latitude may be the extent of its range to the northward. During the summer months, its distribution over the southern portion of the continent may be said to be universal, but withal it is rather a solitary bird and loves to dwell in secluded situations, where, but for its long ringing call, which much resembles its aboriginal name, it would easily escape detection. It flies rather heavily, and on alighting moves the tail up and down for some time: a similar movement of the tail also invariably precedes its taking flight. Like the other species of Cuckoo, it deposits its single egg in the nest of some one or other of the smaller kinds of birds. . . . The food consists of the larvæ of insects of various kinds."

Mr. Thos. P. Austin writes from Cobbora, New South Wales: "The Fan-tailed Cuckoo is never very numerous in this district, but a few arrive every spring, and is of a much more retiring nature than the Pallid Cuckoo. It prefers the more heavily timbered country and scrubs, not so often seen in the open forests or 'ring-barked' paddocks. They are very tame, lazy birds, and will often not flush from a tree until an intruder is almost beneath, then will take a short, laboured flight to another tree, where immediately upon alighting they elevate their tail. I am of the opinion that they have two or more call-notes, but as they are very seldom heard at all, I have not been able to satisfy myself about this; but one day while riding along the edge of a scrub, I heard a bird's

FAN-TAILED CUCKOO.

note such as I had never heard before, and thinking it must be a new species to this district, I followed it up to identify it, when much to my surprise I found it came from a Fan-tail Cuckoo, which was perched low down on a dead branch of a box tree, and I watched it from a short distance for some little time, it calling in the strange note the while, then suddenly it flew down to the ground, and picked up what appeared to be a caterpillar. They usually place their eggs in nests which are not of an open description, but what might be described as a covered dome-shaped nest, and very often those placed upon the ground, many of which it would be quite impossible for so large a bird as the present species to get into, so they *must* lay their egg upon the ground, and then place it in the nest with their beak. In my oological collection I have their eggs taken with sixteen species of foster-parents."

Mr. Edwin Ashby's notes read: "This Cuckoo is migratory in South Australia, reaching our Blackwood district fairly regularly in the first week of April, their weak, mournful whistle quickly calling attention to the newcomer. The whistle is a very soft mournful trill of about six notes with a downward inflection. They leave our district at the end of June or early in July, though I believe a few odd ones stay in parts of the country into the summer. I noted several of these birds on 26th October, 1909, at Middle River, Kangaroo Island, and concluded that they were breeding birds. It seems probable that a certain number may stay right through the year on Kangaroo Island, but it would need a good deal of further investigation before this suggestion could be proved correct or otherwise. In Victoria, wherever I have been in the spring, especially near Mount Dandenong, this Cuckoo has been met with in very great numbers. There they have a habit of settling high up in the lofty gums and utter a loud whistling cry very distinct from the mournful whistle before referred to as the ordinary note of this Cuckoo when in South Australia. So rarely is this call heard in South Australia that at first I thought the Victorian bird a different bird altogether. Evidently the call I refer to is only made use of in the breeding-season. In the Richmond Ranges near Mallanganee in northern New South Wales these Cuckoos were almost as numerous as in Victoria in the month of November, 1912. In May, 1889, I noted a good many of this Cuckoo at Etticup, now called Broome Hill, West Australia; upon comparing skins I collected there with those collected by myself in various parts of this State and at Evelyn, in Victoria, I cannot note any difference in the skins, but in a skin collected by myself on November 7th, 1912, at Mallanganee, northern New South Wales, in the tropical district bordering the Richmond River, I find the rufous coloration extends over the whole of the underside corresponding very closely with a skin I collected on September 29th, 1903, in the Blackall Range, Queensland. This is suggestive of a tendency for the rufous coloration of the underside to increase

THE BIRDS OF AUSTRALIA.

in extent and intensity as the range of the species extends farther north. Some trace of barring can be detected on the flanks in all the skins. In South Australia the stomachs of this Cuckoo usually contained remains of the hairy procession caterpillar. I have seen the birds picking out the caterpillars from the large silken nest this caterpillar congregates in. The hair of the caterpillar is apt to cause a rash on the skin of people handling it, but the Cuckoo appears to find no ill effects."

Mr. A. G. Campbell wrote me: "This Cuckoo is very common in 'Big Scrub,' Richmond River, New South Wales, and in the Dandenong Ranges, Victoria. I have seen a fledgling of this species in a nest of *Petroica rodinogaster*, Upper Yarra, Christmas, 1904, at that time a new record as a foster-parent. In a restricted mountain gully of the Dandenong Ranges, in 1895, I discovered nine nests of *Petroica rosea* in one day, most of them containing fledglings. Visiting the locality several times in 1901 I was able to take three eggs of this Cuckoo, all from Robins' nests, and I also discovered two young Cuckoos being fed by their foster-parents. During 1906, though I may not have searched as carefully as hitherto, I did not find a single Rose-breasted Robin's nest, nor see a single bird. I do not blame egg-collectors for this, but I accuse the Fan-tailed Cuckoos of practically exterminating a lovely species of Robin in a lovely spot (part of a National Park, in fact), where it ought to be safe from extinction by artificial agents. Egg-taking does not decimate numbers; it has rather the reverse effect, it is an incentive to greater fecundity, as instanced in the barn-yard fowl. But the methods of the Cuckoo are more than a match for any other species it insinuates itself upon. The Cuckoo's numbers are, it seems, increasing annually in proportion to those of its foster-parents, for every Cuckoo reared means two, perhaps three, less host birds."

This same item was drawn attention to in connection with the European Cuckoo and the Reed-Warbler, where it was suggested that the Cuckoo preyed upon the host until it became a minimum, when it transferred its parasitical habits to another host until the Reed-Warbler had recovered, by normal breedings, its numbers sufficient to act as host, and probably the host preyed upon in the meanwhile had become incapable of attending to the numbers of the Cuckoo. This seems a matter worthy of more attention than has yet been given to it, especially in conjunction with different localities and years.

Captain S. A. White has written me: "The Fan-tailed Cuckoo in some instances remains with us upon the plains all the year. Its weird note is heard in June sometimes, but generally in July and August, after which it ceases calling; as soon as it moves on the wing the smaller birds 'mob it.' I look upon this as a coastal bird, for I have never met with it in the far north, but plentiful up to sixty or eighty miles from the coast."

FAN-TAILED CUCKOO.

Mr. F. E. Howe's notes read: "Arrives in great numbers at Ringwood during September, and all day long their warbling *decrecendo* note is heard in the gullies. On the fine and sunny days they keep fairly high in the timber, and on dull or rainy days are low down in the creeks. The egg of this bird is often found in the nest of *Acanthiza pusilla*; indeed, it is seldom that a nest of this little Tit is found without an egg or a young one of this Cuckoo, and great numbers of the *Acanthiza* must perish annually that the young Cuckoos may survive. *Sericornis frontalis* also rears a goodly number, and an egg was found in the nest of *Meliornis australasianus*. The young Cuckoo is very pugnacious, and if a finger be inserted into the nest pecks fiercely at it. I believe the Cuckoos pay some attention to the young, if they don't actually feed them. The Cuckoo becomes very silent at the end of December, and although they are often seen, the call is rarely heard after that month. I think the Cuckoo, when placing the egg in a nest (which I believe is accomplished through the agency of the bill) throws out an egg or two of the foster-parent. This makes room for its own, and lessens the labour of the young bird, who ejects the other nestlings; but generally the Cuckoo's egg is the first in the nest. The first egg I saw of this Cuckoo was in the nest of *Acanthiza pusilla*, and with a complete set of that bird: the Cuckoo's egg was on top, and those of the Tit were all dented in, as if it had been *dropped* and not *laid* in the nest. I believe the number of eggs laid by this Cuckoo to be three. In September, 1905, I found three nests of *Acanthiza pusilla* in a certain gully at Ringwood. The first nest contained two eggs and Cuckoo's, second one egg and Cuckoo's, and third Cuckoo's egg only. In the last case the nest was sodden, and looked deserted and appeared to contain the first laid egg of the Cuckoo. The three nests were not more than a quarter of a mile apart, and the eggs of the Cuckoo were all of one type, and each egg had a sharp-pointed appearance at the smaller end, which added to the length of it. When born, the young are blind and featherless, and have a very dark brownish-black skin and the hollow between the shoulders is well defined. One youngster, which I judged to be about five days old, had the eyes well open, and at a week old the young are in long quill, each being tipped with yellow. The gape is yellow, and the inside of the mouth is also yellow. The feet are of a light horn-colour, and the irides are dark brown. At about a fortnight old they are well-fledged, and leave the nest a few days after (sixteen or seventeen), and are tended by the foster-parents for quite another three or four weeks."

Mr. H. Stuart Dove's notes on Cuckoo calls read: "October 3rd.—A trio of Fan-tailed Cuckoos in afternoon near the Don River: one was uttering the usual pretty *trilling call*, the second (which had a very slight reddish tinge on throat) gave the *double-whistle call* with an occasional trill, the third called 'weet-weet' with a shrill quality especially on the second syllable. They kept

THE BIRDS OF AUSTRALIA.

this up for a considerable time, sitting on different trees not very far apart. The *double whistle* referred to is a sort of faint reflection of the English Cuckoo, and is very plaintive, apparently dropping a minor third: it is often continued for a long time, with a short interval between each call." In answer to my queries he wrote: "I believe that the bulk of the Cuckoos which leave Tasmania in the autumn, winter in New South Wales and Queensland. Individuals of both *C. pallidus* and the present species remain with us through the winter, both on this north-west coast and in the neighbourhood of Launceston, although the majority, of course, leave for the mainland. My friend Mr. H. C. Thompson heard *one* calling on 19th May, 1912, in the district of Launceston, Northern Tasmania: this is very late to hear their notes. I have often noted individuals during the winter months, but almost always they are silent at this time."

Mr. Tom Carter's observations read: "The Fan-tailed Cuckoo was not noted in the mid-west. It is fairly plentiful about Broome Hill and Albany in the south-west, but not nearly so common as *pallidus*. Their peculiar quavering whistling note was usually heard about Broome Hill in July. The following dates note first arrivals: July 14, 1908: July 17, 1910: July 17, 1912. An egg of this species was found by me in a nest containing two eggs of *Calamanthus montanellus* (Rock Field-Wren) on Sept. 1, 1910. The nest was on scrubby 'sand plain.' Another egg was afterwards brought to me in company with a clutch of eggs of *C. montanellus*."

Mr. A. W. Milligan, recording his field observations on the Birds of the Margaret River, South-west Australia in the *Emu*, Vol. II., p. 74, 1902, wrote: "Fan-tailed Cuckoo. These birds were fairly numerous in the karri forests, but confined to them. On my first visit (October, 1901) I secured two specimens. On my second visit (Xmas, 1901) two young birds were shot. The under-surface of the plumage was in colour between chocolate and chestnut, and fairly blotched with a darker shade."

Mr. H. L. White's List of Foster-parents for the Fan-tailed Cuckoo (*Emu*, Vol. XIV., p. 148, 1915), reads: "*Petroica multicolor*, *Whiteornis goodenovii*, *Amaurodryas vittata*, *Gerygone olivacea*, *Wilsonavis fusca*, *Rhipidura flabellifera*, *Leucocirca tricolor*, *Lalage tricolor*, *Pycnoptilus floccosus*, *Hylacola cauta*, *Calamanthus fuliginosus*, *Epthianura albifrons*, *Origma solitaria*, *Chthonicola sagittata*, *Acanthiza nana*, *A. pusilla*, *Geobasileus chrysorrhous*, *Neosericornis lathamii*, *Sericornis longirostris*, *S. magnirostris*, *Tasmanornis humilis*, *Malurus cyaneus*, *Leggeornis lamberti*, *Ryania melanocephala*, *Stipiturus malachurus*, *Mytisa striata*, *Pseudartamus cyanopterus*, *Pachycephala pectoralis*, *Lewinornis rufiventris*, *Eopsaltria australis*, *Neositta leucocephala*, *Austrodicæum hirundinaceum*, *Melithreptus lunatus*, *M. atricapillus*, *M. lewinii*, *M. fasciogularis*, *Paraptilotis chrysops*, *Nesoptilotis flavicollis*, *N. leucotis*, *Lophoptilotis leadbeateri*,

FAN-TAILED CUCKOO.

Ptilotula penicillata, *Meliornis novæhollandiæ*, *Ramsayornis fasciatus* and *Lichenostomus ornatus*."

With regard to ejection of young foster-nestlings much has been written in the *Emu*, but in so many cases the notes concerning the different species are so intermingled that no peculiarities of the different genera have been distinguished. The best work to be done by Cuckoo students is to specialise in one Cuckoo, and work out the life-history as clearly as possible for a district, paying attention to the details which are enumerated in connection with the European Cuckoo under the preceding species, with the additional items peculiar to Australia, such as times of coming and going, laying, position of nests selected, antagonism or otherwise to other Cuckoo genera in the district, effect of parasitism, as given by Campbell, etc. When these have been secured, comparison can be made with the results of other observers and probably some more definite knowledge gained. Thus, Macgillivray, from Cape York, suggests different habits for different species in the same district, and different egg coloration for the same species in different localities.

Australian Cuckoos have been very unfortunate in their nomenclature, through the description of drawings, immature specimens, wrongly localised birds, or all combined. The present species has suffered as much as any, but it seems that the earliest correct name is now in use. As noted above, Vigors and Horsfield described it as *C. cineraceus* and *C. incertus*, and Gould used this name in the Folio edition of his work. In his "Handbook" he altered the name to *C. flabelliformis*, as in the meanwhile the drawings upon which Latham based his descriptions of Australian birds had come to light and been examined by Gray, Strickland and himself. Gray did not attempt to recognise the drawing, but Gould accepted the name, and the species was thence known as *C. flabelliformis*. Latham had copied the drawing when he described his new species, but this had not been utilised in connection with this species, as it showed several discrepancies. However, Gould's usage prevailed until 1906, when North demurred, and peculiarly enough he was agreeable to use the Lathamian name for the smaller "Square-tailed" species. In my "Handlist" I accepted North's decision until such time as I was able to investigate the matter for myself. This soon occurred, and I absolutely rejected *flabelliformis* in any connection with these Cuckoos: there is too much discrepancy in detail to admit the name as absolutely applicable to any Australian species: the barred fan-tail is certainly Cuckoo-like, but not much else can be used.

Then I noted that Latham's *Sylvia rubricata*, which had been accepted as the basis of *Origma rubricata*, was described from the present species. The type painting is very good, but the feet are drawn wrong, as the artist was not an ornithologist; but Sharpe recognised the drawing, without considering the

THE BIRDS OF AUSTRALIA.

effect of his note on nomenclature. It is useful, however, to have a good Lathamian name to replace the "bad" *flabelliformis*, as a change to the lesser species would have been an unhappy one: it is quaint that North's suggestion should ever have found favour.

In 1912 I determined three subspecies as follows:

C. rubricatus athertoni,

Atherton, North Queensland.

Smaller and darker in colour above and deeper below than the typical

C. rubricatus rubricatus,

New South Wales,

and then

C. rubricatus albani,

South-west Australia.

Smaller also, but paler above and below than the typical form. I pointed out that the differences were constant.

These subspecies were maintained in my "List of the Birds of Australia," published in 1913, and I still find them recognisable, I now propose a fourth:

Cacomantis rubricatus eyrei subsp. n.

as I see that the South Australian birds are darker in coloration than the typical series, though of the same size. The type is a male from Eyre's Peninsula, South Australia, collected on the 25th August, 1911. This species does not appear to occur outside Australia and is the largest of the genus.



H. Grönvold, del.

Witherby & Co

$\frac{4}{5}$

CACOMANTIS PYRROPHANUS.
(SQUARE-TAILED CUCKOO)

CACOMANTIS PYRRHOPHANUS.

SQUARE-TAILED (BRUSH) CUCKOO.

(PLATE 352.)

UCULUS PYRRHOPHANUS Vieillot, Nouv. Dict. d'Hist. Nat., Vol. VIII., p. 324, 1817:
 "Nouvelle Hollande" = Java [=Timor?].

CUCULUS VARIOLOSUS Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 300,
 1827: New South Wales.

Cuculus variolosus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 300, 1827.

Cuculus insperatus Gould, Proc. Zool. Soc. (Lond.), 1845, p. 19: New South Wales.; *id.*,
 Birds Austr., pt. xxv. (Vol. IV., pl. 87), 1846.

Cuculus dumetorum Gould, Proc. Zool. Soc. (Lond.), 1845, p. 19: Port Essington, Northern
 Territory.

Cuculus viridirufus "Temm." Bonaparte, Consp. Gen. Av., Vol. I., p. 103, 1850: nom. nudum.

Cacomantis dumetorum Bonaparte, *ib.*, p. 103; Gould, Handb. Birds Austr., Vol. I., p. 620,
 1865; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878.

Cuculus (*Cacomantis*) *tymbonomus* Ramsay, Tab. List Austr. Birds, p. 15, 1888.

Cacomantis insperatus Bonaparte, Consp., Gen. Av., Vol. I., p. 103, 1850; Gould, Handb.
 Birds Austr., Vol. I., p. 619, 1865.

Cuculus brisbanensis Diggles, Queensl. Philos. Soc. Trans., 1872, p. 12: Norman's Creek,
 Brisbane, Queensland; Mathews, Austral Av. Rec., Vol. I., p. 69, 1912.

Cuculus (*Cacomantis*) *insperatus* Ramsay, Tab. List Austr. Birds, p. 15, 1888.

Cacomantis variolosus Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 272, 1891; A. J. Campbell,
 Victorian Naturalist, Vol. XV., p. 18, 1898; Hall, Key Birds Austr., p. 58, 1899;
 Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 572, 1901; Hall, Emu, Vol. I.,
 p. 111, 1902 (N.W.A.); Campbell, *ib.*, Vol. II., pp. 16/178, 1902 (Vic.); Hartert,
 Nov. Zool., Vol. XII., p. 218, 1905; Campbell and White, Emu, Vol. X., p. 197,
 1910 (N.Q.); Broadbent, *ib.*, p. 239, 1910 (N.Q.); North, Austr. Mus. Spec. Cat.,
 No. 1, Vol. III., p. 11, 1911; Stone, Emu, Vol. XII., p. 117, 1912 (Vic.);
 Macgillivray, *ib.*, Vol. XIII., p. 162, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 43,
 1914 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

Cacomantis flabelliformis (not Latham) North, Ibis, 1906, p. 53; Mathews, Handl. Birds
 Austral., p. 57, 1908; Ingram, Ibis, 1908, p. 467 (N.Q.); Mathews, Emu, Vol. IX.,
 p. 58, 1909 (N.W.A.); G. F. Hill, *ib.*, Vol. X., p. 272, 1911 (N.W.A.)

Cuculus pyrrhophanus variolosus Mathews, Austral Av. Rec., Vol. I., p. 21, 1912; *id.*, Nov.
 Zool., Vol. XVIII., p. 293, 1912.

THE BIRDS OF AUSTRALIA.

Cuculus pyrrhophanus dumetorum Mathews, Austral Av. Rec., Vol. I., p. 21, 1912; *id.*, Nov. Zool., Vol. XVIII., p. 294, 1912.

Cacomantis lineatus Dodd, Emu, Vol. XII., p. 165, Jan. 1, 1913: Nelson, North Queensland.

Cuculus westwoodia Mathews, Austral Av. Rec., Vol. I., p. 190, March 20, 1913: Westwood, near Rockhampton, Queensland.

Cacomantis pyrrhophanus variolosus Mathews, List Birds Austr., p. 155, 1913.

Cacomantis pyrrhophanus dumetorum Mathews, *ib.*, p. 156.

Cacomantis pyrrhophanus westwoodia Mathews, *ib.*, p. 156.

DISTRIBUTION. Queensland; New South Wales; Victoria; Northern Territory; North-west Australia.

Adult male. Upper-surface for the most part bronze-brown including the back, wings, and tail; slightly darker on the lesser upper wing-coverts; outer edge of wing creamy-white; inner-webs of flight-quills creamy-white on the basal portion; rump and upper tail-coverts slightly shaded with grey; tail-feathers very narrowly fringed on the outer webs, toothed on the inner ones, and tipped, with white; head dark ash-grey becoming paler on the sides of the crown, sides of face, throat, fore-neck, and breast, the last tinged with fawn-colour; abdomen, sides of the body, under tail-coverts, axillaries and under wing-coverts fawn-colour, paler and inclining to cinnamon on the last; under-surface of quills pale brown with creamy-white inner edges; lower aspect of tail pale brown tipped and notched on the inner-webs with white. Eyes brown; feet yellowish-grey; bill blackish. Total length 235 mm.; culmen 18, wing 136, tail 114, tarsus 17. Figured. Collected at Parramatta, New South Wales, in July, 1909.

Adult female. Very similar to the adult male.

Immature. General colour above pale brown barred and marked with pale rufous or fawn-colour; crown of head dark brown, the feathers laterally margined with rufous; hind-neck similar, but the margins narrower and paler; upper wing-coverts dark brown, narrowly fringed with rufous and rufous bars on the median and greater series; outer edge of wing dull white; bastard-wing and primary-coverts bronze-brown marked with pale rufous at the tips; primary and secondary quills bronze-brown marked on the outer webs and at the tips, as well as a portion of the inner web, with pale rufous, a large patch of white on the inner-webs towards the base; tail-feathers bronze-brown barred with rufous, tipped with white and partially barred with white on the inner-webs; sides of face for the most part rufous marked with brown, throat, fore-neck, and breast brown, the feathers fringed and marked with white, or smoky-white; abdomen, sides of body, axillaries and under tail-coverts white barred with brown; under wing-coverts white barred or spotted with brown and tinged with pale buff; under-surface of quills pale brown, with an oblique patch of white and more or less marked with pale rufous; lower aspect of tail barred with brown, rufous, and white. Figured. Collected at Hunter's Hill, New South Wales, in August, 1881. And is very similar to Vigors and Horsfield's type of *variolosus*.

Egg. Pearly white, a band round the larger end, blotched and spotted with purple and lavender. 19-22 mm. by 15-18.

Breeding-season. October to January.

UNDER the name *Cuculus variolosus* Vigors and Horsfield described a bird sent by Caley with the note: "The specimen now described has much the appearance of a young bird; and we find that Mr. Caley in his Notes seems to

SQUARE-TAILED (BRUSH) CUCKOO.

think it belongs to our two last species, which we have already stated that he fancied were the same. Upon inquiring, however, further from that gentleman, we find that his suspicions were founded merely on the circumstance of his having met with all these birds in the same place and at the same period. Although we have some doubt respecting our *C. incertus* being a distinct species, we have little respecting the present bird, which seems to belong to a different section of the genus from that in which the preceding species are included. The wings are shorter and more rounded, the tail also shorter and less graduated, and the *tarsi* are more naked and more elevated. There are six or seven species of *Cuculus* belonging to Australia and Africa, which form part of the same section of the group, and which differ from the bird before us only in their colours being bright and metallic. It is the want of these colours chiefly that causes us to consider the specimen before us as a young bird. In its general structure it has the characters of the birds to which we allude, and which in their young state are also without the shining tints of the adult birds, although perhaps not so decidedly so as our present species. Mr. Caley informs us that he met with the three last described species in the neighbourhood of Parramatta. They frequented the *green wattle-trees* which were of low growth. They made their appearance on the approach of winter; and it was Mr. Caley's opinion that they migrated southerly at the commencement of spring."

Gould, ignoring the clear statement as to the differences, described a new species under the name *Cuculus insperatus*, writing: "While traversing the cedar brushes of the Liverpool Range on the 26th of October, 1839, my attention was attracted by the appearance of a Cuckoo, which I at first mistook for the *Cacomantis flabelliformis* on comparison differ in its smaller size in the more square form of the tail" and added "*Cuculus dumetorum* from the north-western coast, differs from *C. insperatus* in being of a much smaller size and in the whole of the plumage being browner."

There seems to be little on record regarding this species.

Mr. J. P. Rogers' notes from North-west Australia read: "Aug. 19, 1908. Heard one of these birds calling at Wyndham. Again on 23rd about twenty minutes after sundown. Sept. 10th. Saw the bird and during October heard at various times, apparently a straggler as it was heard near the same place. On Nov. 3 many of these birds were seen, in company with *O. osculans* and *N. basalis*: they were feeding at the same spot on the banks of Parry's Creek. Very numerous throughout November and continue during the wet season up to March after which time they were not seen." From Melville Island he wrote: "Cooper's Camp, Oct. 15, 1911. Since reaching here a few of these birds have been seen or heard. Dec. 16, 1911. Are

THE BIRDS OF AUSTRALIA.

rare here, only seen occasionally. Jan. 13, 1912. Ten miles S.E. of Snake Bay. This species is very common here, many being seen or heard every day. Feb. 5, 1912. Cooper's Camp. None have been recently seen here."

Macgillivray (*Emu*, Vol. XIII., p. 162, 1914) has written: "The Square-tailed Cuckoo, or a smaller variation of it, was common at Cape York, frequenting the swamps and open pockets, and being rarely met with in the scrubs. The tea-tree swamps behind the mangroves are resorted to by the small Honey-eater, *Glyciphila modesta*, for breeding purposes. In numbers of their nests Mr. McLennan found one or more eggs of a Cuckoo—pure white, sparingly spotted with fine specks of brown, very like, yet distinguishable in shape and lustre from the eggs of the Honey-eater. Such an egg has been attributed to *Cacomantis castaneiventris*, a bird never seen out of the scrub and never by any chance in the mangrove or tea-tree swamps, where these eggs found were. On this evidence it is fair to assume that the eggs found in the nests of *Glyciphila modesta* are those of this smaller form of *C. variolosus*. This type of egg was also found in a nest of *Ptilotis analoga* in scrub, and also in a nest of *Malurus amabilis*. At the Jardine River a young Cuckoo was obtained as a specimen, which, though differing remarkably from the adult bird, was probably the young of *C. variolosus*. It was being fed by a pair of *Glyciphila modesta* and was taken in tea-tree country. On one occasion two of these Honey-eaters were noticed chasing a Square-tailed Cuckoo out of a swamp where they had their nest. Although these Cuckoos were so numerous, no eggs were found which bore the least resemblance to the eggs of the Square-tailed Cuckoo of more southern latitudes. A male of this northern form measures in the flesh $8\frac{3}{8}$ inches; irides reddish-brown, eyelids pale greenish-grey, upper mandible blackish-brown, lower a shade lighter; legs pale olive, soles of feet yellow. Stomach contents, hairy caterpillars, beetles and other insects."

Mr. Edwin Ashby wrote me: "I have a skin that was obtained at Ourimbah, New South Wales, but with the exception of an immature bird which I shot at Torrington, New South Wales, on April 8, 1910, I have never met with this Cuckoo."

I have not quoted many of the notes, but here give one by Mr. J. A. Ross from the *Emu*, Vol. XII., p. 280, 1913: "During the last four months of 1912 Cuckoos were very numerous throughout Victoria, and from all quarters came the monotonous and melancholy calls of the different species. North of Lake Tyrrell, in the Mallee country, in September, Messrs. F. E. Howe, T. H. Tregellas and I noticed the Pallid (*Cuculus pallidus*), Fan-tailed (*Cacomantis flabelliformis*), Bronze (*Chalcococcyx plagosus*), Narrow-billed Bronze (*C. basalis*), and Black-eared (*Mesocalius palliolatus*) Cuckoos, and saw an egg of the Fan-tailed species in a nest of the Chestnut-rumped Ground-Wren (*Hylacola pyrrho-*

SQUARE-TAILED (BRUSH) CUCKOO.

pygia) and eggs of the Narrow-billed Bronze Cuckoo in nests of the Chestnut-rumped Ground-Wren and Tawny-crowned Honey-eater (*Glyciphila fulvifrons*). At Ringwood most of my excursions were in company with Messrs. Howe and A. C. Stone. We observed that, of the above-mentioned species of Cuckoos, only the Black-eared was missing, but the Square-tailed (*C. variolosus*) was there in addition. Throughout October and November it was an unusual thing to find a nest of certain species of birds which did not contain a Cuckoo's egg. For the first time during an experience extending over several years, I found eggs of the Square-tailed Cuckoo. Almost every nest of the Scarlet-breasted Robin (*Petroica leggiai*) contained an egg of the Square-tailed Cuckoo or of the Narrow-billed Bronze Cuckoo. Five cases of the former were recorded, and the same number of the latter. In the cases of the Square-tailed Cuckoo one nest held an egg of the Robin, another two eggs of the Robin, a third three eggs of the Robin, and a fourth two young Robins; while in the last case the egg of the Cuckoo had been placed in the nest before building was complete and had been covered with the lining."

Although so little has been recorded of the habits of this Cuckoo, H. L. White gives the following list of foster-parents of its eggs (*Emu*, Vol. XIV., p. 149, 1915): "*Microeca fascinans*, *Kempia flavigaster*, *Petroica multicolor*, *Littlera chrysoptera*, *Belchera rosea*, *Whiteornis goodenovii*, *Gerygone olivacea*, *Wilsonavis fusca*, *Rhipidura flabellifera*, *Howeavis rufifrons*, *Setosura setosa*, *Leucocirca tricolor*, *Myiagra rubecula*, *Piezorhynchus alecto*, *Monarcha melanopsis*, *Acanthiza pusilla*, *Sericornis longirostris*, *S. magnirostris*, *Malurus cyaneus*, *M. coronatus*, *Leggeornis lamberti*, *Ryania cyanocephala*, *Pachycephala pectoralis*, *Eopsaltria australis*, *Amytornis woodwardi*, *Ramsayornis fasciatus*, *R. modestus*, *Paraptilotis chrysops*, *Ptilotula flavescens*, *Broadbentia flava*, *Conopophila rufogularis* and *Neositta chrysoptera*."

The nomenclature of this species is just as much involved as any of the other Australian Cuckoos. As noted above, Gould did not notice that he was re-naming Vigors and Horsfield's species, and Shelley, in the *Catalogue of the Birds in the British Museum*, Vol. XIX., was careless of names as well as facts where African birds were not concerned. Consequently, when he noted the identity of the earlier name, he synonymised it wrongly, utilising "*C. variolosus* = *C. tymbonomus* = *C. dumetorum*" and "*C. insperatus* = *C. assimilis* = *C. infaustus*." As *C. insperatus* was described from the type locality of *C. variolosus*, a rearrangement was necessary. North indicated the confusion in 1906, and in 1912 I reviewed the forms in a short article in the *Austral Avian Record*, Vol. I., pt. 1, 1912. I there concluded that *Cuculus pyrophanus* Vieillot was referable to this species, but Pucheran had stated that it came from "Java," not New Holland as given in the original description.

THE BIRDS OF AUSTRALIA.

I also stated that the north-west form was easily separable and therefore recognised Gould's *dumetorum*.

While this species has been recognised from Timor, it has not been recorded from Java, so still there appears to be some confusion which, however, cannot be cleared up at the present time.

I concluded: "I have not seen any extra-Australian specimens which can be confused with either *C. dumetorum* or *C. variolosus*," and this still holds good.

The recognisable subspecies have not been well determined. I added *C. westwoodia* in 1913 three months later in publication to Dodd's *C. lineatus*. I recognised that my form was a subspecies of the present, and so relegated it in my List, where I attributed Dodd's *C. lineatus* from the description to the Fan-tailed species. Since then I have received Dodd's type, and find that it is an immature of this species, and, moreover, is in so close agreement with the type of *variolosus* that it could be almost mistaken for it. From Melville Island Rogers sent birds showing both dark and pale under-surfaces procured on the same day. It is possible that two races may converge here and diverge again, as only the dark form was sent me from Parry's Creek, North-west Australia. It seems unwise to further complicate the nomenclature in view of the doubt regarding the exact type locality of *pyrrhophanus*, so that I conclude it will be best to allude to all the north-west birds from Parry's Creek to Melville Island and Port Essington as

Cacomantis pyrrhophanus dumetorum (Gould).

The southernmost form, which is found in South Queensland, New South Wales, and Victoria, will bear the name

Cacomantis pyrrhophanus variolosus (Vigors and Horsfield).

The birds from Normanton to Cairns will be called

Cacomantis pyrrhophanus lineatus (Dodd).

I now propose

Cacomantis pyrrhophanus vidgeni subsp. n.

for the small Cape York form, differentiated by Macgillivray as being smaller and laying a different type of egg, and it is also paler than the preceding. The type is a male collected by W. Maclellan at Cape York on the 17th of April, 1912. Probably many forms will later be separated in New Guinea, whence the birds have been called *C. assimilis* (Gray) which was given to an Aru Island bird. The complexity of the problem is so clearly seen in Australia that series are necessary to determine the races, but when such are at hand the solutions are comparatively easy.

GENUS—VIDGENIA.

VIDGENIA, nov. Type *V. castaneiventris* (Gould).

I SEPARATE this species on account of the difference in the plumage stages, the immature of this genus having the plumage almost as in the adult, whereas in *Cacomantis* the immature feathering is so different, being conspicuously barred above and below, as to have caused many times the separation of new "species."

When this suggested itself, I examined the birds and then found, as might have been expected, that small structural differences were apparent. Thus, the tail is longer than the wing, which has developed a different wing-formula, the tip being formed of four feathers, the second, third, fourth and fifth, the third and fourth being subequal, the second and fifth being also equal.

Order CUCULIFORMES.

No. 406.

Family CUCULIDÆ.

VIDGENIA CASTANEIVENTRIS.

CHESTNUT-BREASTED CUCKOO.

(PLATE 353.)*

CUCULUS (CACOMANTIS) CASTANEIVENTRIS Gould, Ann. Mag. Nat. Hist., Ser. III., Vol. XX., pt. II., p. 269, 1867 : Cape York, Queensland.

Cuculus (*Cacomantis*) *castaneiventris* Gould, Ann. Mag. Nat. Hist., Ser. III., Vol. XX., p. 269, 1867 ; *id.*, Birds Austr., Suppl., pl. 55 (pt. 4), Dec., 1867 ; Ramsay, Tab. List Austr. Birds, p. 15, 1888 ; Mathews, Austr., Av. Rec., Vol. I., p. 21, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 294, 1912.

Cacomantis castaneiventris Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 274, 1891 ; Hall, Key Birds Austr., p. 58, 1899 ; Campbell, Ibis, 1899, p. 362 (N.Q.) . *id.*, Nests and Eggs Austr. Birds, Vol. II., p. 574, 1901 ; Mathews, Handl. Birds Austral., p. 57, 1908 ; Barnard, Emu, Vol. XI., p. 24, 1911 (N.Q.) ; Macgillivray, *ib.*, Vol. XIII., p. 163, 1914 (N.Q.) ; H. L. White, *ib.*, Vol. XV., p. 61, 1915 ; Mathews, List Birds Austr., p. 156, 1913.

Cacomantis castaneiventris castaneiventris Mathews, Austral Av. Rec., Vol. II., p. 92, 1914.

DISTRIBUTION. North Queensland.

Adult male. General colour above dark bluish-slate colour including the head, back, wings, and tail ; outer edge of wing whitish, flight-quills dark brown with a greenish tinge on the outer aspect and more or less white on the inner-webs ; tail somewhat more blue than the back, all the feathers tipped with white, the outer ones notched on the inner-webs with white and blotched in two places on the shafts with the same colour, on the outermost pair these two white marks almost join up and form an incomplete or mottled bar ; fore-part of the head, sides of the face, and chin tinged with hoary grey ; throat, breast, sides of the body, abdomen and under tail-coverts chestnut ; axillaries and under wing-coverts cinnamon-buff ; under-surface of flight-quills broadly margined with white on the basal portion ; lower aspect of tail dark purplish-blue on the middle feathers, becoming paler on the outer ones which are more profusely marked with white. Eyes with inner circle brown, outer yellow ; eyelids bright yellow. Feet and tarsus bright yellow ; bill black with the base of lower mandible yellowish-brown. Figured. Collected at Cape York, North Queensland, on the 27th September, 1911. Total length 225 mm. ; culmen 15, wing 109, tail 112, tarsus 16.

Adult female. Similar to the adult male.

* The plate is lettered *Cacomantis castaneiventris*.



H Grönvold. del

Witherby & C^o.

$\frac{11}{12}$
CACOMANTIS CASTANEIVENTRIS.
(CHESTNUT-BREASTED CUCKOO).

CHESTNUT-BREASTED CUCKOO.

Immature male.—General colour of the upper-surface rust-brown including the top of the head, sides of the face, hind-neck, entire back, rump, upper tail-coverts, scapulars, and outer aspect of the wings; bastard-wing, primary-coverts, and flight-quills dark bronze-green, the inner-webs of the last cream-white on the basal portion; middle tail-feathers dark bronze-green margined with rufous, the latter colour increasing in extent on the outer feathers which are only mottled, or blotched with pale bronze-green; lores, cheeks, throat, breast, abdomen, sides of body, under tail-coverts, axillaries and under wing-coverts pale cinnamon-buff, paler on the under wing-coverts and under tail-coverts; base of flight-quills below cream-white, the remaining portion bronze-brown; lower aspect of tail pale rufous, the central feathers bronze-green in the middle, the outer ones blotched with the same colour but rather paler. Eyes black; bill black with lower mandible horn colour; feet yellow. Collected at Cape York, North Queensland, on the 14th of July, 1916. This is the only immature bird of this species that I know of. (To be figured later.)

Egg. Authenticated eggs not known. Eggs of the preceding species have been attributed to this bird in error.

THIS beautiful Cuckoo has practically speaking little history, as it is rare and local. It was described from Cape York and has been recorded from New Guinea collections, but it is probable that several subspecies have been confused.

Macgillivray (*Emu*, Vol. XIII., p. 163, 1914) has written: "The Chestnut-breasted Cuckoo finds its living in the thick tropical scrubs of the peninsula, and was not seen out of them, and never in the mangroves or tea-tree swamps. It is a beautiful bird, with its glossy dark slaty-blue upper-surface, rich chestnut underparts and bright yellow eyelids. It feeds on beetles and other insects. Its nesting habits require further elucidation. Mr. M'Lennan is certain that the eggs found in the nests of *Glyciphila modesta* are not those of this Cuckoo. The only Cuckoo eggs, apart from those of *C. russata*, found in the scrub were those found in the nests of *Ptilotis analoga* and *Malurus amabilis*, and they are indistinguishable from those found in the nests of *Glyciphila modesta*, and *Cacomantis variolosus* is occasionally found in the scrub."

H. L. White (*Emu*, Vol. XIV., p. 150, 1915) has given as foster-parents, *Sericornis magnirostris* and *Neochmia phaeton*. These are apparently the eggs which Macgillivray is doubtful of, and the first seems to be part of the record by Le Souëf (*Ibis*, 1899, p. 362). "This bird I saw on many occasions on the Bloomfield River, near Cooktown, and often heard it uttering its mournful note during the night. I have also noticed it flying among the bushes, evidently hunting for nests. I never saw or heard the Fan-tailed Cuckoo (*C. flabelliformis*) in the district. Mr. R. Hislop has sent me a clutch of eggs of *Sericornis magnirostris*, in which was deposited the egg of a Cuckoo, which I have little doubt was laid by *C. castaneiventris*."

This bird is probably very local, as Ogilvie-Grant (*Ibis*, Jubilee Supplement No. 2, December, 1915, p. 182) recording the species from the Setakwa and

THE BIRDS OF AUSTRALIA.

Utakwa Rivers, South-west New Guinea, wrote: "I am not fully satisfied that these three birds have been rightly referred to typical *C. castaneiventris*. Compared with the type specimen from Cape York and with birds from the Astrolabe Mountains, they seem rather darker, especially on the underparts, and slightly larger. Wing 115, 115, 116, as compared with type 112 and Astrolabe Mts. 112 and 112 mm."

I had in the *Austral Avian Record*, Vol. II., p. 92, 1914, described *Cacomantis castaneiventris bihagi* from Bihagi, head of the Mambare River, British New Guinea, writing: "Differs from *C. c. castaneiventris* in being much darker on the under-surface."

Ogilvie-Grant also admitted from the Mimika, Wataikwa and Iwaka Rivers a series under the name *C. c. arfakianus* Salvadori, writing: "These birds seem to be undoubtedly referable, and agree with the description in being smaller and paler both above and below."

I have examined the series Ogilvie-Grant was considering and find they are all referable to one form, the dark coloured specimen being adult, while the lighter ones are the first adult plumage, the shortness in wing measurement being due to the fact that the birds were in moult. That they should have been regarded, for a moment, as representing two forms, indicates the complexities in connection with the identification of birds of this family.

Ogilvie-Grant also described a young bird, remarking: "As in the young of *C. castaneiventris* Gould," but only the New Guinea young had been previously described by Rothschild and Hartert (*Nov. Zool.*, Vol. XIV., p. 436, 1907), and the only immature of the Australian bird that I know is in my collection.

I here describe the young and have had a figure prepared, which will appear later, and have based a generic distinction upon the difference between the immature and those of its supposed congeners. In this way we may arrive at the truth. Recently a noted worker suggested that the nomenclature of birds was more necessary as a "left luggage" ticket than as a means of displaying facts—an extraordinary conclusion with which I totally disagree. The whole end of ornithology in my view is the elucidation of the economics of bird-life and structure, internal and external, to the co-operation with other scientists in the advancement of knowledge.

GENUS—OWENAVIS.

OWENAVIS Mathews, Austral Avian Record, Vol. I., p. 3,
1912.. .. Type *O. osculans*.

Misocalius auctorum

Not—

Misocalius Cabanis und Heine, Vol. IV., pt. i., p. 16, 1862.

Also spelt—

Mesocalius Gould, Handb. Birds Austr., Vol. I., p. 621, 1865.

Nisocalius Gray, Handl. Gen. Sp. Birds B.M., pt. II., p. 218, 1870.

THIS endemic Australian genus is differentiated by its coloration and size from the genera *Cacomantis* and *Lamprolaima*. It has the long bill of the former and the square tail of the latter, the coloration suggesting evolution from the ancestral form of the latter and inclining to its non-relationship with the former. Gould named it "*osculans*," indicating this affinity, placing it with the Bronze Cuckoos, afterwards writing: "MM. Cabanis and Heine have established the above genus for the bird I had called *Chalcites osculans*, and as I have adopted many of the new genera into which the Cuculidæ are now divided, I have no alternative but to adopt this one also. The only species of the form yet discovered is a larger or more robust bird than the little Bronze Cuckoos, and it also differs from them in its colouring."

In the *Austral Avian Record*, Vol. I., p. 3, 1912, I discussed the case of *Misocalius*, pointing out that it was based on Latham's *Cuculus palliolatus*, and no generic diagnosis given. Consequently it cannot be used for a different species.

OWENAVIS OSCULANS.

BLACK-EARED CUCKOO.

(PLATE 354.)*

- CHALCITES OSCULANS Gould, Proc. Zool. Soc. (Lond.) 1847, p. 32 : New South Wales.
Chalcites osculans Gould, Proc. Zool. Soc. (Lond.) 1847, p. 32 ; *id.*, Birds Austr., pt. XXIX.
 (Vol. IV., pl. 88), Dec. 1, 1847.
Cuculus osculans Gray, Genera Birds, Vol. II., p. 463, 1857.
Chrysococcyx osculans Gould, Introd. Birds Austr., octav., p. 67, 1848.
Mesocalius† *osculans* Gould, Handb. Birds Austr., Vol. I., p. 621, 1865 ; Masters, Proc. Linn. Soc., N.S.W., Vol. I., p. 57, 1875 (Gulf) ; Carter, Emu, Vol. III., p. 96, 1903 (M.-W.A.) ; North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 15, 1911 ; Howe, Emu, Vol. IX., p. 230, 1910 (Vic.) ; Chandler, *ib.*, Vol. XIII., p. 37, 1913 (Vic.) ; Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.) ; Cheney, *ib.*, p. 207, 1915 (Vic.).
Mesocalius palliolatus (nec Latham) Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 192, 1877 ; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 279, 1891 ; Hall, Key Birds Austr., p. 59, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 575, 1901 ; Hall, Emu, Vol. I., p. 111, 1902 (N.W.A.) ; Hartert, Nov. Zool., Vol. XII., p. 218, 1905 (N.T.) ; A. J. Campbell, Emu, Vol. VI., p. 197, 1907 ; G. F. Hill, *ib.*, Vol. VII., p. 21, 1907 (Vic.) ; Mathews, Handl. Birds Austral., p. 57, 1908 ; *id.*, Emu, Vol. IX., p. 7, 1909 (N.W.A.) ; Gibson, *ib.*, p. 76 (S.W.A.) ; Whitlock, *ib.*, p. 193, 1910 (W.A.) ; G. F. Hill, *ib.*, Vol. X., p. 272, 1911 (N.W.A.) ; Wilson, *ib.*, Vol. XII., p. 32, 1912 (Vic.) ; Gilbert and Keane, *ib.*, Vol. XIII., p. 80, 1913 (N.S.W.).
Owenavis osculans osculans Mathews, Austral Av. Rec., Vol. I., p. 21, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 294, 1912 ; *id.*, List Birds Austr., p. 156, 1913 ; S. A. White, Emu, Vol. XIV., p. 187, 1915 (Cent. A.).
Owenavis osculans rogersi Mathews, Austral Av. Rec., Vol. I., p. 13, 1912 ; Parry's Creek, North-west Australia ; *id.*, Nov. Zool., Vol. XVIII., p. 294, 1912 ; *id.*, List Birds Austr., p. 156, 1913.

DISTRIBUTION. Australia (rarely coastal).

Adult female. General colour of the upper-parts, including the scapulars, and upper wing-coverts, hind-neck and upper back, pale earth-brown with pale edges to many of the feathers, paler and inclining to ash-grey on the head, lower back, rump, and upper tail-coverts ; bastard-wing and primary-coverts uniform brown ; flight-quills pale bronze-brown, darker on the basal portion but more extended towards the tips

* The plate is lettered *Owenavis rogersi*.† Also spelt *Misocalius*.

H. Grönvold. del

Witherby & Co

$\frac{1}{12}$
OWENAVIS ROGERSI.
(WESTERN BLACK-EARED CUCKOO)



BLACK-EARED CUCKOO.

on some of the primary-quills; the lateral upper tail-coverts are margined with white at the tips; tail bronze-brown, the middle feathers darker, broadly tipped with white, and an indication of a dark subterminal band; the feathers on the fore-head have minute dark central lines; a short line of black on the sides of the crown slightly behind the line of the eye; lores whitish and continue over the eye and along the sides of the crown, where it widens out and inclines to pure white; upper eyelid whitish, short feathers in front of the eye, lower eyelid, and ear-coverts blackish, the last intermixed with buffy-white; the feathers leading from the base of the lores to below the eye whitish; throat and entire under-surface pale cinnamon-buff, paler and inclining to white on the vent, lower flanks, and under tail-coverts, the bases of the feathers being dark sometimes show through; axillaries, under wing-coverts, and inner edges of the quills below cinnamon-rufous, remainder of the quills below pale bronze; lower aspect of tail darker bronze-brown than the flight-quills with broad white tips and a dark subterminal band on the outer feathers. Eyes brown, feet and tarsus leaden black. Bill black. Total length 206 mm.; culmen 14, wing 112, tail 90, tarsus 18. Figured. Collected at Point Torment, North-west Australia on the 14th of February, 1911.

Adult male. Similar to the adult female.

Egg. Uniform brownish chocolate-colour 19–21 mm. by 15.

Breeding-season. March (Central Australia).

GOULD in 1865 admits having only seen five examples of this species, two of which he had killed himself in New South Wales. He wrote: "Judging from the little I saw of this species in a state of nature, its habits were those of the members of the genus *Lamprococcyx*; thick shrubby trees of moderate height appeared to be its favourite resort, and its food to consist of insects obtained among the branches and from off the leaves, in search of which it hops about with stealthiness and quietude; further than this little is known respecting it. One of my specimens was killed near Gundermein, on the Lower Namoi, on the 24th of December, 1839; but the true habitat of the species has not yet been discovered. That it is confined to Australia is almost certain, but this can only be verified by future research. Gilbert, who observed this bird in Western Australia, states that it is very shy, and that he only met with it in the interior of the country. It utters a feeble, lengthened, and plaintive note at long intervals. It flies slowly and heavily, and but short distances at a time. The stomach is thin and capacious, and slightly lined with hairs of caterpillars."

Gilbert and Keane (*Emu*, Vol. XIII., p. 80, 1913) give accounts of the egg discoveries of this species in New South Wales and note that they saw young ones being fed by the Little Field-Wren, recording: "On Dec. 12, 1912, an adult Black-eared Cuckoo was seen flying from the direction of a nest under observation. Closer examination revealed that an egg of the Little Field-Wren had been ejected and was lying four inches from the entrance. Two eggs of the foster-parent and one of the Cuckoo were found in the nest, thus showing, as in common with other Cuckoos, that where a full set already exists one is thrown

THE BIRDS OF AUSTRALIA.

out and replaced by a Cuckoo's egg. . . . The adult appears to do most of its feeding on the ground, as we have frequently flushed it while walking slowly. Its flight resembles that of the two Bronze Cuckoos (*C. basalis* and *C. plagosus*)."

Mr. Thos. P. Austin of Cobbora, New South Wales, has written me: "Until the early spring of 1914 I had never seen a living bird of the Black-eared Cuckoo, but on October 18th, 1913, a young friend, who lives about twelve miles from here, wrote to inform me that he had found a nest of the Little Field-Wren with two eggs, also an egg of a Cuckoo. Thinking it would be sure to be an egg of the Fan-tail, I was very much surprised a few days later, when he brought me the set, to find the stranger was an egg of the present species, this being the first instance of this bird visiting this district. But during the spring and summer months of 1914-15 these birds were fairly numerous here, and I had splendid opportunities of studying their habits, and twice evidence of their breeding here came under my notice, but in both cases they used the nest of *Chthonicola sagittata*. One nest contained a young bird which I examined many times before it left the nest, but by that time it was so fat and large the nest could not have accommodated it, had it not expanded as the young Cuckoo grew. The other nest contained an egg of the visitor, and two of the rightful owner. They are extremely quiet birds, and owing to their habits in this respects, can easily escape notice, usually seen in some low bush growing in fairly thick scrub, where they lazily hop about gathering their food, often sitting perfectly still for a few minutes, then will probably fly down on to the ground to feed at short intervals, over which they hop about in a very quiet, sedate manner. When in a bush they will often allow an intruder to approach within a few feet of them, to all appearance taking not the slightest notice. A person unaccustomed to their nature would imagine the bird had not observed them, but upon a still closer inspection they just simply slowly fly to a neighbouring bush only a few yards away. They appear to move about alone, as I have never seen two birds together, nor have I ever heard one call or utter a note of any sort. The young bird which I examined in a nest was just brownish-grey all over."

Captain S. A. White's conclusions read: "As far as South Australia is concerned, this is a northern bird and seems to keep to the drier parts of the State. I found it thinly scattered over the far interior during my many trips through Central Australia; it has a very distinctive call and when once heard would not be forgotten. Small birds mob them, drawing the traveller's attention to the Cuckoo, which most likely would be otherwise overlooked."

Mr. Edwin Ashby's notes confirm the preceding: "The Black-eared Cuckoo appears confined to the drier districts of this State. I have never noted it in the

BLACK-EARED CUCKOO.

Adelaide Hills, but have seen it in the Mallee country between the Adelaide Hills and the River Murray. I have a specimen in my collection procured at Rhine Villa on 6th Sept., 1907, a male, and last year (1916) on the 8th September several birds were calling in the tall mallee in the neighbourhood of Mackara on the Broken Hill line. I secured a male which shows considerably less rufous coloration on the underside than the Rhine Villa specimen. The call of this bird, while reminding one of the call of *C. basalis*, is very distinct. The long-drawn-out first note dying away with a downward inflection, is much weaker than in *basalis*; at some distance the first note is the only portion of the whistle heard, and then reminds one of the warning whistle of the Scrub Robin. It is only when one is nearer that the second and lower note is distinguishable. The bird is in the habit of settling on some exposed bough, often a dead one, and keeps up the double whistle for quite a long time. Although the cry is so much weaker than that of *C. basalis*, it is strangely penetrating, the bird being usually double the distance away the sound leads one to expect."

Mr. F. E. Howe wrote me: "Have only seen two individuals in the Mallee. Once at Pine Plains, Sept. 1907, and once at Kow Plains, Sept. 1908. The last I secured: it had been perched on a dead mallee bush and had flown down to capture a caterpillar when I got it. When skinning it I thought it contained an egg and was very careful not to break it, but to my surprise it turned out to be a very hard round ball of caterpillars very low down in the abdomen and quite close to the vent."

Mr. Tom Carter states: "I should call the Black-eared Cuckoo distinctly rare, as only two birds were obtained by me during nearly thirty years residence in West Australia. Both of them were obtained near Point Cloates. One was on a rocky range, May 19th, 1898, and the other near a flooded flat, thirty miles inland, April 16th, 1900. Both of these birds were creeping quietly about, and feeding in low bushes."

Mr. J. P. Rogers' notes read: "Parry's Creek, North-west Australia, Nov. 2, 1908.—Four of the above species seen for the first time this season. Nov. 3. A great many to-day. Nov. 5.—Still very numerous. Nov. 14.—Numbers are increasing. Never saw so many Cuckoos in one spot. These birds were at the same place as the *C. basalis*, but are even more numerous, or perhaps their being larger and bolder than the smaller bird makes them more conspicuous. Nov. 17.—Have now left the place as the caterpillars have nearly gone. Dec. 7, 1908.—Not common now, but three seen to-day. March 16, 1909. None seen for some time. April 2, 1909.—One came into a tree near my camp."

Whitlock (*Emu*, Vol. IX., p. 193, 1910) writing of the Birds on the East Murchison observed: "Much commoner than the Pallid Cuckoo, but I had no

THE BIRDS OF AUSTRALIA.

luck in finding its eggs, though I was very keen on the quest. It is not the first time I have been disappointed in a locality where the bird has not been uncommon. I am inclined to think we have much to learn respecting its breeding habits."

H. L. White (*Emu*, Vol. XIV., p. 150, 1915) gives only three foster-parents for this Cuckoo, viz., *Neosericornis lathamii*, *Chthonicola sagittata* and *Pyrrholæmus brunneus*. The egg seems to show relationship with the Bronze Cuckoos, so that criticism of the nestling might assist in determining its exact place, which superficial features suggest. I am keeping on emphasising these points as I find so little is known that every item would help, and it must be conceded that the egg-structure is quite a useful aid even in this group noted for the variability of its eggs.

This interesting species was described by Gould and his name must be used. It is an interior bird which appears to be pushing its way coastward. Notwithstanding its distinct appearance it has shared with the other Cuckoos unnecessary confusion as to its nomination. When the "Watling" drawings were examined in 1843 by Gray, Strickland and Gould, apparently one of them wished the acceptance of *Cuculus palliolatus* Latham, which Gould denied. Cabanis and Heine, however, utilised the Lathamian name, citing Gould's as a synonym. From this citation errors arose, though such should never have happened, as Gould in his Handbook definitely stated: "That this bird is not identical with the *Cuculus palliolatus* of Latham, as supposed by MM. Cabanis and Heine, is, in my opinion, quite certain; Latham's description does not agree with it in any particular; besides which it is not likely that the bird, which is strictly confined to the interior of the country, could have been sent to England at the period at which he wrote; it is even now extremely rare in our collections."

This explicit statement was ignored by Shelley in the *Catalogue of the Birds in the British Museum*, Vol. XIX., p. 279, 1891, who called the species *Misocalius palliolatus*, apparently without reference at all to Latham's description, which states: "This is nearly twelve inches long . . . the crown full of feathers and as far as the eyes on each side black . . . tail very short. . . ." Even as Gould stated, this description disagrees in detail, yet on Shelley's confirmation the incorrect name was used until North pointed out its inapplicability. Simultaneously I examined the Watling drawing and saw at once it had nothing to do with this bird, though Sharpe without any consideration had recorded that it was the Black-eared Cuckoo. I have not recognised the drawing, but if it were to be assigned to any Cuckoo it would much better agree with *Microdynamis parva* (Salvadori), a New Guinea bird, but at present I consider it quite indeterminable.

I separated two subspecies in 1912 and these have been maintained in my

BLACK-EARED CUCKOO.

“ List of the Birds of Australia ” in 1913, and here I tentatively retain them. The distinctions do not now appear so well marked, but this seems to be due to the lack of complete series showing plumage and seasonal changes. As the bird appears to be spreading on the east towards the coastal districts it is possible the differences will become more marked in the future.

The evolution of the genus from the ancestral form of *Lamprococcyx* is presumed, and if it spreads to the wetter districts it is sure to become darker, more glossy and more like a Glossy Cuckoo than the desert bird is. The egg suggests that of the Bronze Cuckoos, while it is recorded that its flight recalls that of these latter birds.

GENUS—CHALCITES.

CHALCITES Lesson, *Traité d'Ornith.*, p. 152, 1830 Type *C. basalis*.
Neochalcites Mathews, *Austral Avian Record*, Vol. I.,
 p. 7, 1913 Type *C. basalis*.

IN the place quoted above I wrote: "Lesson proposed a race name *Chalcites* for the Shining Cuckoos. This name has often been used in connection with the Australian Bronze Cuckoos, inasmuch as the bird called *Cuculus chalcites* by Temminck, and included by Lesson, was supposed to be a young bird belonging to this group. However, *Chalcites* was only proposed by Lesson as a race-name, and therefore it is inadmissible as a generic name from that introduction."

Since this was written it has been agreed by authorities on nomenclature that such race-names should be admitted and consequently I here make use of it.

As the type species is the one I separated generically I would note that I had contemplated sinking my own genus, but upon reconsideration I found the differences demand full generic recognition. Further, if that should be denied, the name would become valid for the whole of the Indo-Australian species classed under *Chalcococcyx* in the *Catalogue of the Birds in the British Museum*, Vol. XIX., but which I separated into *Chalcococcyx*, *Lamprococcyx* and *Neochalcites*.

The peculiar bill and coloration separate the first-named, while the latter (now *Chalcites*) was distinguished on account of the absence of bars on the under-surface of the immature. I now find that the particularly narrow bill is accompanied by the structurally long naked legs and longer tail. The throat is longitudinally striped, and the upper-surface as well as the barring below shows little bronze coloration. To these may be added the very different egg coloration.



H. Grönvold, del.

Witherby & Co

$\frac{1}{12}$

NEOCHALCITES BASALIS.
(*NARROW-BILLED BRONZE CUCKOO*.)

CHALCITES BASALIS.

NARROW-BILLED BRONZE CUCKOO.

(PLATE 355.)*

CUCULUS BASALIS Horsfield, Trans. Linn. Soc. (Lond.) Vol. XIII., p. 179, 1821 : Java.*Chrysococcyx lucidus* Gould, Birds Austr., Vol. IV., pl. 89 (pt. xxix.), 1847, upper and lower figures.*Lamprococcyx modesta* Diggles, Trans. Philos. Soc. Queensl., 1876, p. 12 : Norman's Creek, Brisbane, Queensland ; Mathews, Austral Av. Rec., Vol. I., p. 70, 1912.*Lamprococcyx basalis* Gould, Handb. Birds Austr., Vol. I., p. 626, 1865 ; North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 23, 1911.*Chalcites basalis* Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 385, 1877 (Q.) ; Ramsay, *ib.*, Vol. II., p. 192, 1878 ; *id.*, *ib.*, Ser. 2, Vol. II., p. 170, 1887 (N.W.A.) ; *id.*, Tab. List Austr. Birds, p. 15, 1888.*Cuculus basalis* Legge, Papers Proc. Roy. Soc. Tasm., 1886, p. 238, 1887.*Chalcococcyx basalis* Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 294, 1891 ; Hall, Key Birds Aust., p. 59, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 576, 1901 ; Hall, Emu, Vol. I., p. 110, 1902 (N.W.A.) ; A. G. Campbell, *ib.*, Vol. II., p. 16, 1902 (Vic.), p. 208, 1903 (King I.) ; Carter, *ib.*, Vol. III., p. 96, 1903 (M.W.A.) ; Berney, *ib.*, Vol. VI., p. 44, 1906 (N.Q.) ; G. F. Hill, *ib.*, Vol. VII., p. 21, 1907 (Vic.) ; Mathews, Handl. Birds Austral., p. 58, 1908 ; Whitlock, Emu, Vol. VIII., p. 191, 1909 (W.A.) ; Mathews, *ib.*, Vol. IX., pp. 8-59, 1909 (N.W.A.) ; Gibson, *ib.*, p. 76, 1909 (S.W.A.) ; Whitlock, *ib.*, p. 193, 1910 (W.A.) ; Howe, *ib.*, p. 230, 1910 (Vic.) ; Wilson, Emu, Vol. XII., p. 32, 1912 (Vic.) ; Stone, *ib.*, p. 117 (Vic.) ; S. A. White, *ib.*, Vol. XIII., p. 24, 1913 (S.A.) ; Chandler, *ib.*, p. 37 (Vic.) ; Macgillivray, *ib.*, p. 163, 1914 (N.Q.) ; Barnard, *ib.*, p. 207, 1914 (N.T.) ; *id.*, *ib.*, Vol. XIV., p. 43, 1914 (N.T.) ; Cheney, *ib.*, p. 207, 1915 (Vic.).*Chrysococcyx basalis* Hartert, Nov. Zool., Vol. XII., p. 218, 1915 (N.W.A.).*Chrysococcyx basalis mellori* Mathews, Austral Av. Rec., Vol. I., p. 14, Jan. 2, 1912 : Eyre's Peninsula, South Australia ; *id.*, Nov. Zool., Vol. XVIII., p. 294, 1912.*Chrysococcyx basalis wyndhami* Mathews, Austral Av. Rec., Vol. I., p. 14, Jan. 2, 1912 : Point Torment, North-west Australia ; *id.*, Nov. Zool., Vol. XVIII., p. 295, 1912.*Neochalcites basalis mellori* Mathews, List Birds Austr., p. 157, 1913.*Neochalcites basalis modestus* Mathews, *ib.**Neochalcites basalis wyndhami* Mathews, *ib.** The plate is lettered *Neochalcites basalis*.

THE BIRDS OF AUSTRALIA.

DISTRIBUTION. Australia; Tasmania

Adult male. General colour above bronze-green with coppery reflections on the head and back; upper wing-coverts, scapulars, and innermost secondaries with narrow edgings of buff or whitish; bastard-wing and primary-coverts dark brown, flight-quills dull bronze-green on the outer webs, which are slightly edged with whitish and brown on the inner ones, the last are white at the base and more or less tinged with rufous; head, hind-neck, mantle, and back copper-bronze; upper tail-coverts bronze-green, as are also the two middle tail-feathers, the next pair of tail-feathers similar with a dark subterminal band, a white spot at the tip on the inner web, and a tinge of rufous on the outer web towards the base, the following pair are like the last with an additional amount of rufous which occupies the outer web on the basal portion, the penultimate pair of feathers entirely rufous on the basal two-thirds of their length, a buffy-white spot towards the tip on the inner web which has a dark shadow, and the outer web slightly edged with white, the outermost pair blackish-brown on the inner web, becoming paler towards the tips, with large ovate spots of white, the outer web pale brown incised with white; sides of the face including the ear-coverts brown intermixed with buff or buffy-white; chin and upper throat buff streaked with brown; fore-neck and sides of neck also buff with dusky-brown semi-circular bars to the feathers; middle of breast, abdomen, and vent white; sides of breast, sides of abdomen, sides of body, axillaries, and under wing-coverts white, regularly barred with bronze-brown; under tail-coverts white, some of the feathers having bronze-brown shaft-lines and others pear-shaped spots of the same colour; under-surface of quills pale brown with an oblique isabelline patch which inclines to white towards the base; lower aspect of tail pale bronze-green marked with dark brown, rufous, and white. Eyes light brown; feet and tarsus dark grey; bill black. Total length 160 mm.; culmen 11, wing 103, tail 70, tarsus 17. Figured. Collected at Parramatta, New South Wales, in July, 1909.

Adult female. Similar to the adult male.

Immature. Head, ear-coverts, hind-neck, mantle, and back dusky-brown; upper wing-coverts, scapulars, innermost secondaries, and upper tail-coverts bronze-brown narrowly edged with rufous, outer edge of wing buffy-white, bastard-wing and primary-coverts brown, flight-quills bronze-green on the outer webs, pale brown on the inner ones, which are rufous at the base, becoming paler and inclining to white on the inner secondaries; the two middle tail-feathers uniform bronze-brown, the next pair rufous at the base and very slightly paler at the tip, the rufous at the base of the following pair increasing in extent towards the tips, an ovate pale rufous spot on the inner web, which is followed by a dark blotch and a white spot at the tip, the penultimate pair similar to the last, but the rufous spot mentioned on the previous pair of feathers is here replaced by white, the dark portion of the feather near the tip in greater contrast, the outermost pair dark brown on the inner webs with somewhat large ovate white spots, outer web paler with three very pale rufous marks and slightly edged with white on the apical portion; throat, breast, and remainder of the under-surface pale ash-grey with a buffy tinge more particularly on the sides of the abdomen and under wing-coverts, paler and inclining to white on the middle of the abdomen and under tail-coverts, the latter having dark shaft-lines; under-surface of quills pale brown with rufous edgings which become paler and inclining to white on the secondaries; lower aspect of tail rufous at the base on the lateral feathers, which are darker at the tips and spotted with white, the middle feathers pale bronze-green, the outermost pair dark brown on the inner webs boldly marked with white, paler on the outer webs and faintly tinged with rufous. Figured. Collected at Beaconsfield, Victoria, on the 28th of February, 1910.

Egg. Ground-colour pinkish, uniformly spotted all over with small pinkish red spots. 17-19 mm. by 12-13.

Breeding-season. July to January.

NARROW-BILLED BRONZE CUCKOO.

THE history of this species appears in Gould's words as follows: "If the residents in the southern portion of Australia will examine the little Bronze Cuckoos which annually visit them in summer, they will find that they are of two distinct species. They bear a general resemblance; but one will be found to have a stouter bill than the other, and a nearly uniformly coloured tail, the outer feather on each side only being barred. This bird may be observed in all the southern parts of Australia from east to west, and I believe in Tasmania. The other species is about the same size, but has a narrower bill, a lighter brown head, a paler coloured back; the outer feathers of the tail strongly barred, as in the last, and the basal portion of the next three feathers on each side rufous chestnut, which colour must, I presume, show very conspicuously when the bird is flying, or when sitting on a tree with its tail spread. I have specimens of this species from South Australia and Moreton Bay, and I believe I may state that it is the Common Bronze Cuckoo of Tasmania, but of this I am not certain; the chances are that both it and the *L. lucidus* is found there. After a careful examination I have come to the conclusion that the stout-billed bird is the *C. plagosus* of Latham, and that the narrow-billed one is identical with the Javan species to which Horsfield gave the appellation of *C. basalis*. Having the type specimen of *C. basalis*, New Zealand skins to which the specific term *lucidus* was originally applied, and examples of *C. plagosus*, wherewith to compare it, I am the more certain of being correct in these conclusions.

"Having said thus much about these little parasitic Cuckoos, I leave to the rising ornithologists of Australia the task of investigating the subject, and of informing the scientific world whether there be any differences in the eggs of the two birds, and the character of the plumage of their nestlings. If their first dress be not nearly uniform, and destitute of any bars on the throat and under-surface, then there is another species yet to be described."

Captain S. A. White's notes read: "*N. basalis* is a plentiful bird in South Australia and is found all over the State, as we met all them all the way to the MacDonnell Ranges in 1913, and I saw them from Oodnadatta to the Musgrave Ranges in 1914, also along the Cooper's Creek Expedition. They are early visitors to the Reedbeds, and in the year 1917 they were calling in their long-drawn mournful tone from the top of a dead tree in June. They invariably lay their eggs in the *Malurus* nests, and it is a very quaint sight to see a pair of Wrens feeding a fully fledged Cuckoo, the latter's appetite being almost insatiable."

Mr. Edwin Ashby's notes confirm the preceding: "This bird is very numerous throughout the Adelaide Plains and the lower hills, and I met with it in quite as large numbers near Mt. Dandenong in Victoria. The shrill whistle, which consists of a long-drawn-out first note dying away with a downward

THE BIRDS OF AUSTRALIA.

inflection, is most penetrating and can be heard for a long distance. The bird keeps it up in spring throughout a large part of the night, much to the discomfort of intending sleepers. Although the whistle referred to is the normal note it sometimes adds a few notes resembling the call of the Australian Pipit. This year (1917) the birds commenced calling at the end of June as the Yellow-rumped Tits had then commenced building (very early): probably the Cuckoo was calling a little earlier than usual. I note that small birds are often disturbed by the call of the Cuckoo, and suggest that the keeping up of the continuous whistle is intended to cause the small birds to reveal the neighbourhood of their nests by their agitation. While the favourite foster-parents of this Cuckoo are the Blue Wren (*M. cyanocephalus*) and the Yellow-rumped Tit (*Geothlypis trichas*), I have found their eggs in the nests of the New Holland Honey-eater and the White-fronted Chat. In looking through my specimens I find a great variation in the extent of the barring on the underside in two specimens, both females; in one skin almost the whole of the under-surface is barred and the under tail-coverts strongly spotted, and in the other the bars are absent from the centre of breast and abdomen and the under tail-coverts only show a few streaks."

Mr. J. W. Mellor has written me: "The Narrow-billed Bronze Cuckoo is fairly numerous here in the spring and summer months; the principal birds that they select as foster-parents are the Blue Wrens, and I have taken a great many of their single eggs from the nests of these which contain generally three eggs in addition to that of the Cuckoo, whose eggs are speckled with deep reddish-brown, the same as those of the Wren. The Cuckoos generally lay from August to October."

Mr. H. S. Dove, from Tasmania, writes: "A Bronze Cuckoo which I judge to be the Narrow-billed was sitting on a wire early in the morning of November 11th calling continuously with a plaintive, penetrating note: the flanks were very distinctly barred, but not, so far as I could make out, the middle of the breast and abdomen. It calls also while flying from perch to perch. On November 25th the same bird still calling from the same place. On 26th another making continually its plaintive call of "see-ee," very penetrating in a tea-tree paddock, which is much frequented by these birds: another at Mersey Bluff calls with a shorter, rounder note like "Phee-u" often repeated: this latter may be the Broad-billed species. However, on October 5th, a Bronze Cuckoo sitting on a stump in the bush paddock, uttering "Phee-u" plaintively, about twelve times in rapid succession, ventriloquially, the first notes seeming far away, then produced louder with widely opened bill so that they seem close by, just as Buller describes the call of *C. lucidus* in New Zealand: the notes conclude more distantly. This bird had no bands on the breast, as far as I could see in

NARROW-BILLED BRONZE CUCKOO.

the field, only on the flanks : it uttered the same notes many times, always with the same ventriloquial effect. These Cuckoos were first noted this spring on 25th September by Mr. Foster at the Mersey Bluff, a great arriving-place for our migrants : a pair were noted in a gum-tree at 10 a.m. that day, just arrived from over Bass Straits, one apparently feeding the other. On October 18th I noted near the mouth of the Mersey a Bronze Cuckoo uttering precisely similar calls to those heard so often in the spring time in the neighbourhood of Launceston, about eight long plaintive notes in series. March 21st, 1909 : This morning early when taking a walk near the beach, I was fortunate enough to see two young Bronze Cuckoos (*L. basalis*) getting their breakfast among the coarse herbage by the roadside, and it was surprising what a number of caterpillars they found and disposed of. They appeared about the size of Sparrows or slightly larger, the upper-surface of a light brown with very slight greenish tint, under-surface light grey, with faint indications of bars on the abdomen. A whitish curved mark extended from over the eye backwards and downwards towards the ear. They were very quiet and allowed me to approach closely ; their note was a sort of "Cheep ! cheep ! cheep !" very different from the loud penetrating calls of the adult. They were this season's birds, and as far as my observations go, are rare on this coast, although plentiful about Launceston. The rufous colouring of basal two-thirds of tail was very conspicuous in flight, as were the dark and white bars on outer tail-feathers."

Mr. Chandler wrote : "Fairly numerous in the Ringwood and Frankston districts. One call slightly resembles that of *C. plagosus*, but no trouble is experienced in distinguishing the difference."

Mr. E. J. Christian has reported that birds were calling at his place in Victoria on May 9th, 1909.

Mr. F. E. Howe has informed me : "This species, together with *L. plagosus*, arrives about September. These Bronze Cuckoos are not infrequently seen in small families of perhaps five or six birds and keeping a certain tree to meet and 'show' in. Shaking the wings, raising and lowering the body and gliding from limb to limb."

With regard to egg deposition and young ejection this species seems to have much the same habits as have been recorded in connection with other Cuckoos. In the cases of these small Bronze Cuckoos, as so many eggs are deposited in small domed nests, it appears to have been long recognised that the eggs must be placed in such nests by the Cuckoo by means of its bill, a fact only recently fully admitted in connection with the larger European Cuckoo, while it may still be true that the larger Cuckoos later to be treated may not use the bill for egg deposition.

Mr. Tom Carter's notes read : "The Narrow-billed Bronze Cuckoo is a winter

THE BIRDS OF AUSTRALIA.

visitant to the mid-west, generally arriving in June. An egg of this species was found in a nest of *Epthianura tricolor* at Point Cloates on March 4th, 1898, and one in a nest of *Calamanthus rubiginosus* on June 1st, 1897. These two species appear to be favorite 'hosts,' as other eggs were occasionally found in them, deposited by these Cuckoos. If rains occur in the summer months, some of these birds are to be seen. They seem to feed mostly in low bushes, or else on the ground. They appeared seldom to visit Broome Hill and were only observed there by me on two or three occasions. One was procured on October 14th, 1911."

Mr. J. P. Rogers' notes made in North-west Australia are as follows: "Parry Creek, Wyndham, Oct. 31, 1908: First seen to-day, also heard other whistling. Nov. 2, 1908: Two were seen to-day; they were in the scrub on the bank of the creek. Nov. 3: Many birds of this species feeding on hairy caterpillars which infest the 'fish poison' bushes at one spot on the creek. Nov. 5 to 6: Still very numerous at the same spot. Nov. 14: Are in great numbers, but only at the one spot. Have never seen so many Cuckoos in one place before. They only extend about half a mile along the creek: in this place the caterpillars are stripping the bushes. Nov. 17: None remain: all went about 14th to 15th. Nov. 25: Several seen or heard at Goose Hill Lagoons. March 21, 1909: Still fairly numerous, but all gone before April 30. At Marngle Creek very few of these birds were seen and they were very wild: I often heard the call, but could not see the bird. None were seen at Mungi."

Hall comments upon birds procured by J. P. Rogers at Derby, North-west Australia (*Emu*, Vol. I., p. 110, 1902): "There is a great difference between the adult males *a* and *b*; (*a*) 23rd July, 1901: Whole under-surface almost white, with narrow bars; fore-head lead colour; crown and nape bronzy; subterminal dark band on tail. (*b*) 6th Sept., 1901: Whole under-surface flushed with rufous, with broad bars, and disappearing upon the throat: fore-head, crown and hind-neck uniform dull ruddy brown." Such differences suggest confusion of species in these small Cuckoos.

Macgillivray (*Emu*, Vol. XIII., p. 163, 1914) recorded: "From Sedan Mr. M'Lennan sent a clutch of eggs of *Malurus assimilis* containing an egg of the Narrow-billed Bronze Cuckoo. I had previously to his visit obtained a skin from the Cloncurry district."

H. L. White (*Emu*, Vol. XIV., p. 150-2, 1915) gives the following long list of foster-parents: "*Stictopeleia cuneata*, *Microeca fascinans*, *Petroica multicolor*, *Littlella chrysoptera*, *Whiteornis goodenovii*, *Smicrornis brevirostris*, *Gerygone olivacea*, *Wilsonavis fusca*, *W. lævigaster*, *Rhipidura flabellifera*, *Howeavis rufifrons*, *Leucocirca tricolor*, *Seisura inquieta*, *Myiagra nitida*, *Hylacola cauta*, *Calamanthus*

NARROW-BILLED BRONZE CUCKOO.

fuliginosus, *Epthianura albifrons*, *Parepthianura tricolor*, *Aurepthianura aurifrons*, *Cisticola exilis*, *Chthonicola sagittata*, *Acanthiza nana*, *A. pusilla*, *A. lineata*, *A. ewingii*, *A. uropygialis*, *Geobasileus chrysorrhous*, *G. reguloides*, *Milligania robustirostris*, *Neosericornis lathamii*, *Sericornis magnirostris*, *Malurus cyaneus*, *M. melanotus*, *M. splendens*, *Hallornis cyanotus*, *Leggeornis lamberti*, *L. amabilis*, *Ryania melanocephala*, *Stipiturus malachurus*, *Aphelocephala leucopsis*, *Neositta chrysoptera*, *Zosterops gouldi*, *Z. lateralis*, *Austrodicæum hirundinaceum*, *Melithreptus affinis*, *Myzomela sanguinolenta*, *Cissomela nigra*, *Acanthorhynchus tenuirostris*, *A. superciliosus*, *Gliciphila melanops*, *G. albifrons*, *Stigmatops indistincta*, *Paraptilotis fusca*, *P. chrysops*, *Nesoptilotis leucotis*, *Lichenostomus ornatus*, *Ptilotula penicillata*, *Phylidonyris pyrrhoptera*, *Meliornis novæhollandiæ*, *M. niger*, *Tæniopygia castanotis*, *Ægintha temporalis* and *Alisteranus cinctus*.

The nomenclature of this species was detailed by me six years ago in the *Austral Avian Record*, Vol. I., p. 13, and I here quote my remarks as some comments are necessary: "*Cuculus basalis* was described by Horsfield (*Trans. Linn. Soc. (Lond.)*, Vol. XIII., p. 179, 1821) from Java. This name has till recently been used for the Australian birds, but with the type, which is almost beyond comparison, and typical specimens before me, I am able to separate the Australian form, and, moreover, can indicate two forms as being confined to Australia. For the east Australian form, which differs from *Chrysococcyx basalis basalis* in its darker upper coloration and larger size I propose the name *Chrysococcyx basalis mellori*. . . type from Eyre's Peninsula, South Australia. For the west Australian form, which can be separated from *C. b. mellori* by its smaller size and duller upper coloration, and from *C. b. basalis* by being larger and darker, intermediate between the latter and *C. b. mellori*, I introduce the name *Chrysococcyx basalis wyndhami*, type from Point Torment, North-west Australia. The wing measurements of these three subspecies are: *C. b. basalis* 90; *C. b. mellori* 107; *C. b. wyndhami* 101 mm. My series leads me to suggest that these birds only make internal migrations. A bird killed on November 4th at Parry's Creek is washed out, faded and sandy, looking exactly as if it had been living in a desert. On the head a few bronze feathers are showing, one or two on the wings and two new bronze tail-feathers are half grown. A bird killed a week later has its plumage fully new bronze-coloured, exactly the same colour as in the new feathers in the former bird. Upon examination I found that birds killed in May in the same district were all in worn plumage, but not to the same state as the first mentioned bird. Consequently I can only conclude that these birds go inland from May to November, and that they moult into their spring plumage generally before returning to the coast. North states that this species "is a permanent resident throughout the year in the neighbourhood of Sydney." It will thus be noted that this bird has probably

THE BIRDS OF AUSTRALIA.

different habits, as to migration, in different parts of Australia, and consequently there is a wide field for research in this respect.

“Two points with regard to the nomenclature of this species require remark. Temminck and Laugier in their *Pl. Col. d'Ois*, 17^e livr., (Vol. I.), pl. 102, fig. 2, 1824, figured a bird which they named *Cuculus chalcites*, a MS. name of Illiger, with *terra typica*, L'Océanie. This bird is undoubtedly the young of this species, but it is impossible to definitely apply it to any race. In order to finally dispose of this name I designate Java as type locality of *Cuculus chalcites* Temminck and Laugier. The other name is *Lamprococcyx modesta* Diggles. This is mentioned by Ramsay (*Proc. Linn. Soc. N.S.W.*, Vol. II., p. 205, 1876), as known to him only by description, and apparently given to the young of *L. basalis*.”

In answer to the last query I received full information, and later accepted Diggles' name as the subspecific one for the north-eastern form.

When I stated *Cuculus chalcites* was undoubtedly the young of this species, I was misled by the figure alone, which was marked male, but a footnote in the text corrected it to female, and there, as the male, the adult of this species was also described. Consequently the name remains as given by a synonym of *basalis*. I would add that Gray in the *Handl. Gen. Sp. Birds*, Vol. II., p. 218, 1870, cited “*chalcites* Ill” as a synonym of “*lucidus* Gm. Austr. and N.Z.” and on p. 219 proposed “*Cuculus temminckii*” for “*chalcites* Tem. P.C. 102.2.” I have not seen Illiger's name recorded prior to Temminck's usage of it, and consequently “*C. temminckii* Gray” must be regarded as an absolute synonym of “*chalcites* Temminck and Laugier ex Illiger MS.,” the last being quoted until prior publication is proven.

Recently a student of the new ornithology has come to the conclusion that “the subspecies theory be discarded as a theory that has outlived its usefulness.” One result of his action is to make confusion worse confounded, as he has *not* “considered geographic variation in connection with the other variations of species” and hence lumped as one species three different “realities” through his muddling method of ignoring subspecies.

I have relegated subspecies to their proper rank as geographical varieties, of species which mutable in themselves are more or less constant when geography is considered. First a species must be regarded as a series of geographical variations, and then the subspecies be separately criticised for sexual, age or individual variation. When this is done it will be found that individual variation in one subspecies becomes geographic in the next and the same with sexual and age variation. The study of these variations is important, and peculiar results may be obtained.

In the present species the variation observed might be considered as sexual, age or individual were geographic subspecies ignored. As a matter

NARROW-BILLED BRONZE CUCKOO.

of fact probably all three combine to distinguish the subspecies. Thus, the colouring of the tail has been regarded as a specific character, and such it is, but it is very variable according to sex and age as well as the individual. Thus, two males from the same locality, apparently both adult, may show very great differences in the amount of rufous on the base of the tail. Again, a male and female generally show decided differences in tail coloration from the same locality, while the immature also shows differences.

Now, from another locality the differences here seen may be constantly fixed and of geographic importance, as the much more rufous condition ascribed to immature and females in the south may be a constant feature of northern males. As the bird is a more or less permanent resident wherever it occurs, it is suggested that full series will cause the admission of many subspecies, and, moreover, when such are independently studied many features of interest may be revealed which would be lost sight of by a lumping method.

At present I cannot distinguish more than I have already admitted, mainly because the series from a given locality generally show too many immatures in proportion to the adults, and while these are of extreme value my studies lead me to use them conservatively. Again, odd specimens from such localities as Cape York and Melville Island suggest a movement of some sort, but do not give much clue. It is possible that variation in the same locality may be due to unknown movements, while study of extra-limital series would be of great interest. The under-surface development needs further study than has been given it; the immature nestling is unbarred, then few bars appear, mostly on the sides of the body; and generally the adult shows few far apart bars, the centre remaining unbarred. Some specimens, however, show narrow bars more closely set and almost extending across the abdomen. This variation has not been fixed with geographical significance, yet in the allied genus it is distinctive of distinct species. The throat striping as distinct from barring is characteristic of the genus.

A peculiar feature in connection with age development will be dealt with under the species *L. russatus*, a form I referred to this genus, before good series explained the plumage changes and proved the present genus must depend on structural characters more than colour variation.

GENUS—LAMPROCOCYX.

LAMPROCOCYX Cabanis und Heine, Mus. Hein., Vol. IV.,
p. 11, 1863 Type *L. lucidus*.

THIS genus of Shining Cuckoos is distinguished from *Chalcites* by the broader bill, shorter legs and feet, comparatively shorter tail and more bronze colouring above and on bars below, the throat also barred. The species referable to this genus are not well understood, but are comparatively constant in the generic characters, while their specific features are not easily determined. The species appear to be local, and more or less sedentary and of restricted range.

Key to the Species.

- A. Upper surface copper-bronze *L. plagosus*.
- B. Upper surface bronze-green
 - A. No russet on tail-feathers *L. lucidus*.
 - B. Russet on inner webs of tail-feathers except the central
and outside pair.
 - a1 Faint russet band on chest, inner web of
under primaries deep buff *L. russatus*.
 - b1 No russet band on chest, inner web of under
primaries very light buff *L. minutillus*.



H. Grönvold, del.

Witherby & C^o

$\frac{11}{12}$

LAMPROCOCCYX LUCIDUS.
(BROAD-BILLED BRONZE CUCKOO).

LAMPROCOCYX LUCIDUS.

BROAD-BILLED BRONZE CUCKOO.

(PLATE 356.)

CUCULUS LUCIDUS Gmelin, Syst. Nat., p. 421, 1788 : Queen Charlotte Sound, New Zealand.*Cuculus lucidus* Gmelin, Syst. Nat., p. 421, 1788.*Cuculus nitens* Forster, Descr. Anim., ed. Licht., p. 151, 1844 (not of Forster, 1792) : Queen Charlotte Sound, New Zealand.*Lamprococcyx lucidus* Cabanis and Heine, Mus. Heine, Vol. IV., p. 14, 1862 ; North, Austr. Mus. Spec. Cat. No. 1., Vol. III., p. 22, 1911 ; Mathews, List Birds Austr., p. 157, 1913.*Chrysococcyx lucidus* Buller, Birds New Zealand, p. 77, 1873 ; *id.*, *ib.*, 2nd ed., Vol. I., p. 132, pl. 15, 1888 ; Mathews, Austral Av. Rec., pp. 15-21, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 295, 1912.*Chalcococcyx lucidus* Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 295, 1891 ; Hall, Key Birds Austr., p. 59, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 580, 1901 ; Mathews, Handl. Birds Austral., p. 58, 1908 ; Fulton, Trans. N.Z. Inst., 1909, p. 392, 1910 ; Campbell and White, Emu, Vol. X., p. 197, 1910.*Lamprococcyx lucidus australis* Mathews, Bull. Brit. Orn. Club, Vol. XXXVI., p. 83, May 25, 1916 : Queensland (Capricorn Group of Islands).

DISTRIBUTION. (New Zealand) ; Queensland.

Adult male. General colour of the upper-surface green or bronze-green with strong copper reflections on the head, hind-neck, mantle, and lesser upper wing-coverts ; bastard-wing, primary-coverts, and flight-quills bronze-brown with white on the basal portion of the inner webs of the last ; tail bronze-green with a slight indication of a dark subterminal band, a white spot on the inner web at the tip of the lateral feathers, which is only indicated on the pair next to the two central ones but increases in extent towards the outermost, this last is largely marked with white and shaded with dark brown on both webs ; terminal portion of outer web paler ; lores, feathers above and below the eye, and fore part of head tipped with white ; throat and entire under-surface of body, including the under wing-coverts, white barred with bronze-green ; under-surface of quills pale brown with an oblique patch of white on the basal portion ; lower aspect of tail dusky-grey, darker subterminally and on the basal portion, the white spots and dark shadows on the outer feathers are similar to those on the upper side. Eyes greenish-yellow ; feet blue-grey ; bill black, base of lower mandible brown. Total length 170 mm. ; culmen 13, wing 103, tail 67, tarsus 15. Figured. Collected on the North Island of the Capricorn Group, off Queensland, on the 11th of October, 1910.

Adult female. Similar to the adult male.

THE BIRDS OF AUSTRALIA.

Immature General colour of the upper-surface for the most part copper-bronze, inclining to bronze-green on the scapulars, rump, and upper tail-coverts; bastard-wing, primary-coverts and flight-quills uniform brown tinged with bronze on the outer webs and white on the basal portion of the inner-webs of the last; tail copper-bronze with an indication of a dark broad subterminal band, a spot of white at the tip on the inner web of each of the feathers except the middle pair, the penultimate pair barred with white on the inner-webs, the outermost pair also barred with white on the inner-webs and indented with white on the outer ones, the white at the tip on the inner-webs encroaching on to the margin of the outer webs; lores, feathers in front of the eye, and a line over the eye whitish; hinder-face and sides of neck bronze-brown, the feathers barred with white; throat and fore-neck whitish, the feathers barred or otherwise marked with dusky brown; remainder of the under-surface, including the axillaries and under wing-coverts, white barred with bronze-brown; under-surface of quills pale brown with white bases to the feathers, except the three outer ones; lower aspect of tail greyish-brown with a dark subterminal band and marked with white like the upper-surface. Figured. Collected on Lord Howe Island on the 13th of February, 1915.

WHETHER the New Zealand Cuckoo occurs in Australia at all seems a questionable conclusion. At first the Australian and New Zealand species were confused, and at the present time their relationships are not exactly known.

The Tasmanian form of the Australian species recalls the New Zealand so closely that the latter was assigned to Tasmania when the former were separated.

A long essay on the New Zealand Bronze Cuckoo by Fulton appears in the *Trans. New Zeal. Inst.*, 1909, pp. 392-408, 1910, to which reference may be made. Facts and fancies in connection with other Cuckoos as well as the New Zealand one are there included. I do not propose to concern myself with reference to the habits as there given, but would comment upon the distribution. Fulton wrote: "The Bronze Cuckoo is probably a native of New Guinea, and annually migrates to New Zealand, passing through or near New Caledonia, the Kermadecs, Norfolk Island, and striking the coast from the Western ocean, traverses the islands, and even goes farther on, appearing at the Chatham and the Macquarie Islands a day or so later, thus forming an additional link in the large chain of evidence as to the original land connection of the various islands forming what is known as the New Zealand plateau. That the birds come over the ocean from the north-west I will present evidence later on; but I would like to point out that they have been recorded at Lord Howe Island. After sojourning with us for a few months, and producing a considerable number of young ones, these summer visitors quietly return to their home in the tropics." Fulton then quoted Hutton in 1871 as writing: "Leaves New Zealand in the winter, and is found in Australia, Tasmania, New Caledonia, Java and Sumatra," to which Hutton and Drummond in 1904 added: "Norfolk Island, Cape York Peninsula." A further quotation from Campbell's *Nests and Eggs of Australian Birds*: "Extends down the east of Australia to Tasmania and New Zealand." Fulton then added: "One correspondent who lived for many years in North Taranaki,

BROAD-BILLED BRONZE CUCKOO.

and knew the bird well, and had, in fact, for years noted the date of its arrival, writing from Perth, Western Australia, says that "the bird was very common there in December, 1908, especially on the Darling Ranges on the west coast."

All the preceding were more or less inaccurate, so that the conclusions arrived at by Fulton are consequently unreliable. He was quite ignorant of the systematics of the species and was dependent upon others in like case. Fulton concluded: "It is much more likely that the birds come from a large continent like New Guinea than from some scattered islands in the Pacific; and the fact that the bird has Australian range before mentioned entirely disposes of the idea that New Caledonia is its wintering-place. New Caledonia may be a stopping-place, but there is no doubt in my mind that New Guinea will be found their home, and that the two land-bridges—one down through New Caledonia, Kermadecs, Norfolk Island to New Zealand and the Chathams; the other down northern and eastern Australia to Tasmania—satisfactorily account for their presence in Australia and New Zealand. It is quite possible that the Australian individuals are stragglers who have been blown a little to the west at the time of starting from New Guinea, have struck the coast of Australia, and have come straight on down Cape York Peninsula, instead of winging their way on towards New Caledonia." The drawback to this hypothesis is the fact that the bird has not yet been met with in New Guinea, nor even New Caledonia, while, as I stated, it is questionable whether the New Zealand Cuckoo has occurred in Australia.

Fulton then continued: "Supposing these Cuckoos all start at about the same time, the strongest birds would obtain a lead by the stream of birds tailing out on a journey of this length, and the males, on arrival, would be comparatively quiet until the arrival of the females. . . . The birds come down from the north-west, and strike the coast-line in great numbers, for evidence is forthcoming that they are heard almost as early in the south of Otago as in the north of Auckland, and the dates on which they are stated as being seen and heard throughout the islands do not connect or coincide in a manner sufficient to prove to us that the birds reach the far north first and gradually work south, though this is, of course, possible. They have been heard as early as Sept. 7 in North Taranaki, and Sept. 15 in Otago." As most of Fulton's conclusions are based on the assumption of the New Zealand Cuckoo migrating from New Guinea they need not be further criticised.

In the *Austral Av. Rec.*, Vol. I., 1912, I wrote upon this subject, pointing out (p. 15): "Its winter quarters are not yet known." "At the present time the wintering of *C. lucidus* is one of the puzzles of Australasian ornithology." In the same place (p. 16) I described the New Caledonian Cuckoo as a new species quite distinct from the Australian *C. plagosus* or the Neozelanic

THE BIRDS OF AUSTRALIA.

C. lucidus. Also "Whether *Cuculus plagosus* should be considered a subspecies of *Cuculus lucidus* or not, is a question I am at the moment unable to answer." I am still unable to determine the affinities of the forms, though Brasil (*Revue Francaise d'Ornith.*, 7^e An., p. 204, 1916), dealing with the New Caledonian form, agreed with my separation, but recorded it as a subspecies of *lucidus*. This seems a very bad solution, as many other species seem more closely related to *lucidus* than *layardi* appears to be.

However we cannot dogmatise on these points, as North stated he had seen three specimens from Australia, one collected at Cape York, and the other two, both adult females, from the neighbourhood of Sydney.

In the *Emu*, Vol. X., p. 197, 1910, Campbell and White recorded from the Capricorn Group: "Broad-billed Bronze Cuckoo (*Chalcococcyx lucidus*). Several beautiful Bronze Cuckoos, in uniform metallic-green upper plumage, were observed, and specimens secured. These birds were exceedingly tame, catching insect prey near our camps. By dress and song it is not the Bronze Cuckoo (*C. plagosus*) of southern parts, but is nearest in description to the New Zealand Shining Cuckoo (*C. lucidus*). In this opinion Mr. A. W. Milligan and other experts share. The winter home of the New Zealand species is supposed to be Northern Queensland and New Guinea; if that be so the Capricorns would be within the fly-line, while October is about the time these Cuckoos reach New Zealand. The finding of these birds at the Capricorns is one of the interesting features of the expedition of the R.A.O.U."

In 1912 I wrote: "Through the kindness of Capt. S. A. White I have been enabled to examine one of the specimens then obtained, and there can be no doubt it is a genuine *C. lucidus*. I have another specimen with only Queensland as the locality, and these two are the only true *C. lucidus* I have seen from localities outside New Zealand."

I received a series from Mr. Roy Bell collected at Lord Howe Island, and these prove very puzzling, as, though the males are quite like the males of *lucidus*, the females differ and are more like *plagosus*, while the bill is more like that of the first named rather than of the latter. They breed on that island, and the Capricorn birds were procured in October, which is late, as Fulton records the first week of September as the time they are first heard, and that they probably arrive in the colony some time before that.

The species was added to the Australian Avifauna by Hall in his "Key" in 1899, taking the records given in the *Catalogue of the Birds in the British Museum*, Vol. XIX., p. 296, 1891, one specimen from the Gould collection marked "Australia" and three from the Cockerell Collection labelled (incorrectly) Cape York.

I distinguished the Australian killed specimen as follows: "*Lamprococcyx*

BROAD-BILLED BRONZE CUCKOO.

lucidus australis. Differs from *L. l. lucidus* (Gmelin) in having more bronze on the upper-surface and on the bars on the under-surface. Wing 107 mm. Queensland."

Study of the Lord Howe series show the fully adult males to so closely resemble the Neozelanic fully adult males of typical *lucidus* as to be separable only by the difference in the bills which is slight, but noticeable. The adult females, however, have *not* the shining green head but have it dull purplish, but darker, however, than in adult male *plagosus*. The remainder of the upper-surface shows more glossy bronze than is usually seen in the males of *plagosus*, while the under-surface has the barring somewhat of an intermediate nature between these two, *plagosus* and *lucidus*. A peculiar feature however is the close barring of the throat in the majority of the specimens, which is not seen in the birds available of the typical form of the latter. I am dubious as to the exact relationship of these birds, and certainly as to that of *lucidus* and them.

I make a suggestion here which may seem absurd, but may lead to good results. As no specimens in quantity which can be truly referred to *lucidus* have been met with outside New Zealand, the conclusion would be that it did *not* migrate from that Dominion, but that it remained there throughout the year. This means that the observers in New Zealand must recommence their studies and look for the species during the months it is silent. It is apparent from the records that its "arrival" has been generally accepted by the hearing of its note, and its departure likewise accredited to its silence. As birds have been met with later than usual, I now suggest that the Neozelanic Cuckoo, known as *Lamprococcyx lucidus*, is not migratory, but that it is a permanent resident in New Zealand, probably making internal movements according to the seasons.

I may note that New Guinea Cuckoos of this genus, like those of Australia, are more or less resident and comparatively local in their distribution. The status of the Capricorn Cuckoos is a matter for further investigation, but these may have been local migrants, moving from the mainland to the island.

LAMPROCOCYX PLAGOSUS.

BRONZE CUCKOO.

(PLATE 357.)

CUCULUS PLAGOSUS Latham, Index Ornith., Suppl., p. xxxi., 1801 : New South Wales.

Cuculus plagosus Latham, Index Ornith., Suppl., p. xxxi., 1801.

Cuculus lucidus Temminck and Laugier, Pl. Color d'Ois., Vol. I., pl. 102, fig. 1 only, 1824.

Cuculus metallicus Vigors and Horsfield, Trans. Linn. Soc. N.S.W., Vol. XV., p. 302, 1827 : New South Wales.

Chrysococcyx lucidus Gould, Birds Austr. pt. XXIX. (Vol. IV., pl. 89), 1st Dec., 1847. Central figure.

Lampromorpha plagosus Bonaparte, Consp. Vol. Zygod., p. 7, 1854.

Chalcites metallicus Bonaparte, *ib.*

Lamprococcyx plagosus Gould, Handb. Birds Austr., Vol. I., p. 623, 1865 ; Ramsay, Ibis, 1866, p. 331 (N.Q.) ; North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 18, 1911 ; Mathews, List Birds Austr., p. 157, 1913.

Chalcites plagosus Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 192, 1878 ; *id.*, *ib.*, Vol. III., p. 110, 1879 ; *id.*, Tab. List. Austr. Birds, p. 15, 1888.

Chalcococcyx plagosus Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 297, 1891 ; Hall, Key Birds Austr., p. 59, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 582, 1901 ; A. G. Campbell, Emu, Vol. II., p. 16, 1902 (Vic.) ; Milligan, *ib.*, p. 74 (S.W.A.) ; M'Clymont, *ib.*, p. 97 (Tas.) ; A. G. Campbell, *ib.*, p. 208, 1903 (King I.) ; Batey, *ib.*, Vol. VII., p. 11, 1907 (Vic.) ; Ingram, Ibis, 1907, p. 402 (N.T.) ; G. F. Hill, Emu, Vol. VII., p. 21, 1907 (Vic.) ; Mathews, Handl. Birds Austral., p. 58, 1908 ; Littler, Handb. Birds Tasm., p. 86, 1910 ; Howe, Emu, Vol. IX., p. 230, 1910 (Vic.) ; Broadbent, *ib.*, Vol. X., 240, 1910 (N.Q.) ; Wilson, *ib.*, Vol. XII., 32, 1912 (Vic.) ; Chandler, *ib.*, Vol. XIII., 37, 1913 (Vic.) ; Macgillivray, *ib.*, p. 163, 1914 ; (N.Q.) ; Cheney, *ib.*, Vol. XIV., p. 208, 1915 (Vic.).

Chrysococcyx plagosus plagosus Mathews, Austral Av. Rec., Vol. I., p. 22, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 295, 1912.

Chrysococcyx plagosus tasmanicus Mathews, Austral Av. Rec., Vol. I., p. 17, 1912 ; Tasmania ; *id.*, Nov. Zool., Vol. XVIII., p. 295, 1912.

Chrysococcyx plagosus carteri Mathews, Austral Av. Rec., Vol. I., p. 17, 1912 ; Broome Hill, South-west Australia ; *id.*, Nov. Zool., Vol. XVIII., p. 295, 1912.

Lamprococcyx plagosus plagosus Mathews, List Birds Austr., p. 157, 1913.

Lamprococcyx plagosus tasmanicus Mathews, *ib.*, p. 158.

Lamprococcyx plagosus carteri Mathews, *ib.*, p. 158.



H. Grönvold, del.

Witherby & Co

$\frac{11}{12}$
LAMPROCOCCYX PLAGOSUS.
(BRONZE CUCKOO).

BRONZE CUCKOO.

DISTRIBUTION. Queensland ; New South Wales ; Victoria ; Tasmania ; South Australia ; South-west Australia.

Adult male. Upper-surface including the head, mantle, back, and lesser upper wing-coverts, dark copper-bronze, the remainder of the wings, upper tail-coverts and tail bronze-green ; bastard-wing, primary-coverts, and flight-quills uniform brown, the inner-webs of the last isabelline at the base which commences on the third outer primary ; lateral upper tail-coverts tipped with white ; a slightly indicated dark subterminal band on the tail, the two middle feathers bronze-green, each of the lateral ones tipped with white on the inner-web, the pair next to the central feathers slightly marked with rufous on the inner-webs, the inner-webs of the following pair toothed with rufous ; the penultimate pair have the inner-webs barred with white—the white tinged more or less with pale rufous, and the outermost pair more broadly barred with white on the inner-webs and indented with the same colour on the outer ones ; base of the forehead, lores, feathers above the eye and sides of the face speckled with white and bronze-brown ; throat, breast, and remainder of the under-surface white barred with bronze-brown, rather more coppery on the breast and sides of the neck, the bars narrower on the throat, breast, and under wing-coverts and broader on the abdomen, sides of the body, and under tail-coverts ; quills below pale brown with white edges on the basal portion ; lower aspect of tail grey with an incomplete dark subterminal band, coarsely marked with white and slightly tinged, on some of the feathers with pale rufous. Eyes yellowish. Feet and tarsus greenish ; bill black. Total length 162 mm. ; culmen 14, wing 104, tail 69, tarsus 16. Figured. Collected at Cape York, North Queensland, on the 5th of May, 1913.

Adult female. Similar to the adult male.

Immature. Head, hind-neck, mantle, and lesser upper wing-coverts dark copper-bronze, remainder of the wings, back, and tail bronze-green ; median and greater upper wing-coverts very narrowly edged with pale rufous like the primary and secondary quills ; outer edge of wing whitish ; bastard-wing and primary-coverts uniform brown ; flight-quills bronze-green on the outer webs, pale brown on the inner ones, which are buffy white towards the base on the primaries and almost pure white on the secondaries ; tail bronze-green with a dark subterminal band indicated, the four middle feathers very similar, but the next pair differs in having three faint marks of rufous on the inner-webs and a white spot at the tip of the inner-webs slightly indicated, which is more clearly defined on the penultimate pair of feathers and the rufous spots, also on the inner-webs, more clearly pronounced, this pair is also marked with dark brown, or blackish at the base, the outermost pair have five white spots on the inner-webs and three dark marks and two paler ones on the outer webs, there are two dark marks and three paler ones, also four white marks and one, very slightly indicated, and a buffy-white mark near the tip ; lores and feathers above and behind the eye, sides of the face, chin, throat and fore-neck ash-grey with pale dusky-brown intermixed and dark bases to the feathers—the brown more intensified on the sides of the neck and sides of the breast, assuming the form of bars on the sides of the body where the predominating colour is white ; middle of breast, abdomen, under tail-coverts, and under wing-coverts white ; axillaries also white, slightly marked with very pale brown ; under-surface of flight-quills pale greyish-brown with isabelline inner edgings to some of the primaries, becoming white on the secondaries ; lower aspect of tail grey marked with blackish, brown, and white—some of the feathers tinged with rufous. Figured. Collected at Olinda, in Victoria, on the 1st of December, 1912.

Egg. Uniform greenish-olive or bronze. 19 mm. by 13.

Breeding-season. August to December.

THE Bronze Cuckoos of Australia were all included under the name *C. lucidus*, and under that name Gould figured both the Broad-billed and Narrow-billed

THE BIRDS OF AUSTRALIA.

species. When Vigors and Horsfield described the Australian birds in the Linnean Society's Museum they admitted two species thus: *Cuculus lucidus*. "Mr. Caley met with these birds but sparingly, and after the interval of some years. He conjectured that the period of their migration into the colony was not regular, or that few arrived. The species was first discovered in New Zealand, whence they probably migrate into the adjoining continent." As a new species they added *Cuculus metallicus*, writing: "The chief difference between this bird and the preceding species lies in the colours of the upper parts inclining more to a metallic red than to green, in the head and adjacent parts being more saturated, and the *fasciæ* on the *abdomen* being less brilliant; while the marks of the tail-feathers also are distinct. In *C. lucidus* the outer feathers have four white spots on each barb, while in the present species they have five white spots marked with ferruginous. The other tail-feathers of the latter bird are also alternately fasciated with fuscous and ferruginous, while those of *C. lucidus* are free from spots, except a single fuscous band near the apex. We have met with many specimens of *C. lucidus*, all of which accorded in these markings with the bird in our collection; but we have not seen any other specimen of the *C. metallicus* besides the bird before us. This bird differs also from *C. chalcites* Ill., which has been described as a New Holland Cuckoo, in having the *abdomen* fasciated, which in both sexes of the other bird is pure white and free from markings."

In 1865 Gould distinguished the two species as named above, writing: "The New Zealand *Lamprococcyx lucidus* being now considered distinct from the species found in New South Wales, it becomes necessary to determine which specific appellation was first applied to the latter; this I believe to be *C. plagosus* of Latham, which I therefore adopt, and reduce the *C. metallicus* of Vigors and Horsfield, and the *C. versicolor* of Mr. G. R. Gray's *Genera of Birds* to the rank of synonyms.

"The *Lamprococcyx plagosus* is very widely dispersed over every part of the Australian continent, and if it be not migratory in New South Wales, the greater number certainly retire in winter to the northward, where insect-food is more abundant. I have, however, seen it in the Botanic Garden at Sydney in the month of March. Its food consists of insects of various orders, the stomachs of those examined containing the remains of *Hymenoptera*, *Coleoptera* and caterpillars. While searching for food, its motions, although very active, are characterised by a remarkable degree of quietude, the bird leaping from branch to branch in the gentlest manner possible, picking an insect here and there and prying for others among the leaves and the crevices of the bark with the most scrutinising care. Its flight is quick and undulating, and when passing from one tree to another on a sunny day, the brilliant green colouring of the male

BRONZE CUCKOO.

shows very beautifully. . . . The stomach is capacious, membranous, and slightly lined with hair. Its note is a mournful whistle, very like that usually employed to call a dog."

Gould gave no reason for the recognition of Latham's *plagosus*, but this is due to the examination of the "Watling" drawings by G. R. Gray. In the *Annals Magazine of Natural History*, Vol. XI., p. 190, 1843, Gray had noted: "*Cuculus plagosus* Lath., Vieill. nec *C. lucidus*, Gm., V. & H. "Name proposed '*Chrysococcyx plagosus*.'"

Afterwards Strickland and Gould examined the paintings, and, agreeing with Gray's determination, Gould made use of Latham's *plagosus*. At the same time Gray questioned Latham's *Sylvia versicolor* as being "*Chrysococcyx* — ?" and Gould was probably right in quoting *C. versicolor* of Gray as a synonym, but as hereafter noted I do not think that Latham's *Sylvia versicolor* is here referable.

Mr. T. H. Tregellas has sent me the following notes from Victoria: "The Bronze Cuckoo (*L. plagosus*) has been plentiful this season, and a great number have been seen in the parks and gardens of the metropolis as well as in the heart of the bush. As a consequence of their great numbers, a large percentage of their eggs have been found, principally in the nests of the *Acanthiza* family, but a good number in the nests of Wrens and Robins. At Wongan Park on Nov. 2 I found the nest of *P. leggii* about four feet from the ground in a box sapling, the nest beautifully lined with rabbit fur, and containing one young Bronze Cuckoo. Calling next week I saw the bird again, and on the 14th I took the photo of the bird and nest. On Nov. 6 one of my boys discovered a nest of *M. cyaneus* with another young *plagosus* in it. As usual, it was the sole occupant, and was clamouring for food when discovered. The markings of these two were exactly similar and were: Feet, legs and bill light slate, gape cream, roof of mouth orange-buff, irides light slate-blue, feathers on head and neck light brown, bronze just appearing on back and wings, breast grey, abdomen creamy-white with transverse bars just appearing. I note one specimen is slightly rufous on breast: this is probably a day or two older."

Mr. Chandler thus described a younger specimen: "Fledgling in Blue Wren's nest about one week old. Feathers on shoulders breaking showing bronze: back bare: primary quills one inch long: tail half an inch: feathers on breast and flanks creamy: gape cream: roof of mouth light brown: feet and legs slate: irides brown."

Mr. A. H. E. Mattingley has written me: "I have noticed six or seven cocks wooing a single hen bird. The cock woos the hen, or rather its love is displayed, by outstretching its wings, at the same time it leans forward on

THE BIRDS OF AUSTRALIA.

the wing so that its metallic green back feathers show up, and should the bird be in the sunlight, the colour of its green back is most vivid, and appears like shot silk."

A. G. Campbell reporting on the Birds of King Island (*Emu*, Vol. II., p. 208, 1903): "It is noticed that the female Cuckoos are silent and very shy, while the males of the smaller species whistle during the nesting season at all times of the day, sometimes rivalling one another from adjacent tree tops."

Mr. Edwin Ashby has sent me the following notes: "In South Australia I have only obtained this lovely little Cuckoo (*L. plagosus*) in the higher part of the Adelaide Hills, though I have known of its olive eggs (so different from those of *N. basalis*) being found as low down as the Blackwood district. I have three specimens before me, one from the Adelaide Hills, which I shot in 1888, one a male that was picked up dead in the grounds of the University of Sydney, and the other a female shot by myself at Buli, New South Wales, on October 6, 1915. All are uniformly barred right down to the tail-coverts inclusive. In the specimen from Sydney is a vivid green-bronze (if held between oneself and the light) over the whole of the upper side including central tail-feathers, and the barring of the underside is a similar hue. The other two specimens are a slightly less vivid green. In all three, the outer tail-feathers show no chestnut, and in the inner tail-feathers the chestnut coloration is confined to spots only. I see in my notes that the female obtained at Buli, N.S.W., had a brownish iris, while the Sydney specimen, which was a male, had a yellow eye."

Captain S. A. White has written me: "This bird is not nearly as numerous as *basalis*, while it has become quite a rare bird on the plains in late years, and I have never seen it in the interior. Its habits seem to be the same as those of the other." Other correspondents, as Mr. A. G. Campbell, F. E. Howe, J. W. Mellor, have sent me short notes, but all relating to the discovery of eggs and practically nothing about the bird itself. It appears to be accepted that its habits must be the same as those of other Bronze Cuckoos, and consequently I find little on record regarding these.

I would again emphasise my view that each of the Australian Cuckoos should be independently studied as to its habits, respect also being paid to locality, and then, later, correlation of the recorded facts might be attempted. At the present time I would conclude that we really know little concerning the economics of these little Bronze Cuckoos, though there must be much of interest.

Mr. Tom Carter observes: "This Bronze Cuckoo (*L. plagosus*) was not noted by me in the mid-west, but appears to be resident, though not very numerous, in parts of the south-west. The following observations were

BRONZE CUCKOO.

recorded about Broome Hill. September 8, 1906. One seen. October 14, 1906. Fresh egg in nest of *Acanthiza apicalis*. December 11, 1906. Egg in nest of *Acanthiza chrysorrhoa*. December 15, 1907. Fledged young being fed by *Acan. chrysorrhoa*. About this time there were hundreds of Bronze Cuckoos feeding in the stubble of a neighbour's field. Never saw such a lot of them before or after. Single birds noted February 9, 1907, August 30, 1908. Found an egg in nest of *Acan. apicalis*, October 31, 1908. One killed by flying against a wire fence December 20, 1908, and another seen September 3, 1910, a single bird, was noted, while I have occasionally seen a bird about Albany in summer months."

H. L. White (*Emu*, Vol. XIV., p. 152, 1915) has a long list of foster-parents as: "*Hirundo neoxena*, *Hylochelidon nigricans*, *Microeca fascinans*, *Petroica multicolor*, *Littlera chrysoptera*, *Whiteornis goodenovii*, *Erythrodryas rodinogaster*, *Melanodryas cucullata*, *Amaurodryas vittata*, *Smicrornis brevirostris*, *Gerygone olivacea*, *Ethelornis culicivorus*, *E. magnirostris*, *Wilsonavis fusca*, *W. lævigaster*, *Pseudogerygone personata*, *Heteromyias cinereifrons*, *Rhipidura flabellifera*, *Leucocirca tricolor*, *Myiagra rubecula*, *M. nitida*, *Symposiachrus trivirgatus*, *Lalage tricolor*, *Calamanthus campestris*, *Epthianura albifrons*, *Parepthianura tricolor*, *Aurepthianura aurifrons*, *Conopoderas australis*, *Cisticola exilis*, *Chthonicola sagittata*, *Acanthiza nana*, *A. pusilla*, *A. lineata*, *A. ewingii*, *A. inornata*, *Acanthornis magnus*, *Geobasileus chrysorrhous*, *G. reguloides*, *Neosericornis lathamii*, *Sericornis magnirostris*, *Malurus cyaneus*, *Hallornis cyanotus*, *Ryania melanocephala*, *Campbellornis personatus*, *Austrartamus melanops*, *Colluricincla harmonica*, *Eopsaltria australis*, *Neositta chrysoptera*, *Zosterops gouldi*, *Z. lateralis*, *Cyrtostomus frenatus*, *Melithreptus atricapillus*, *Cissomela nigra*, *Acanthorhynchus tenuirostris*, *Gliciphila melanops*, *Paraptilotis chrysops*, *Nesoptilotis leucotis*, *Lophoptilotis leadbeateri*, *Lichenostomus ornatus*, *Ptilotula penicillata*, *Meliornis novæhollandiæ*, *Ægintha temporalis*, *Neochmia phaeton* and *Pardalotus punctatus*."

In 1912 (*Austral Av. Rec.*, Vol. I., p. 17), I concluded: "Whether *Cuculus plagosus* should be considered a subspecies of *Cuculus lucidus* or not is a question I am at the moment unable to answer. At present I recognise three subspecies of *C. plagosus* as inhabiting Australia. At various times *C. lucidus* has been recorded from Tasmania, but Tasmanian specimens I have examined prove to belong to *C. plagosus*, but differ from the typical New South Wales form in having a much brighter bronze-green upper coloration showing green on the head, therein approaching *C. lucidus*; but still the purple is evident, which is entirely missing in *C. lucidus*. The bill is, moreover, the bill of *C. plagosus*, not of *C. lucidus*. The barring on the under-surface is also much more close. For this form I propose the name of *Chrysococcyx plagosus tasmanicus*. . . .

THE BIRDS OF AUSTRALIA.

The West Australian specimens differ from typical *C. p. plagosus* in almost exactly the opposite manner, being duller above, much less bronze, and less barring underneath. I differentiate these as *Chrysococcyx plagosus carteri*. . . . The migratory movements of the species from the east coast seem to be short, as I have them from most months in the year."

It is suggested that this species is more or less sedentary, as it is not commonly reported from localities outside Australia, nor does it occur in North-west Australia. Macgillivray, however, records it from Cape York (*Emu*, Vol. XIII., p. 163, 1914), writing: "In April, 1911, Mr. M'Lennan obtained two skins of this bird on the Jardine River, Cape York. The birds were not numerous, and those obtained were both females. Irides greyish-brown, eyelids pale green, bill black, legs dark or blackish-green. Stomach contents, caterpillars." I have also specimens procured by Kemp at Cape York, and they are also females. If these were migrating to New Guinea they must only cross the Straits, as the species has not been recorded by the recent Dutch and British Expeditions which procured Bronze Cuckoos, but of peculiar species, not such as could be mistaken for this one. Neither are the birds recorded in the British Museum Catalogue from the Solomons, etc., truly referable to this species as restricted.

I have again criticised New Guinea specimens, but conclude that no subspecific relationship between these and the Australian forms can be accepted. The distribution of Bronze Cuckoos in Australia is somewhat peculiar, and tends to confirm the generic distinction of the Narrow-billed Bronze Cuckoo as it occurs all over Australia alongside the Bronze Cuckoos which are referable to one genus but which appear to be different species. Thus at Cape York, *plagosus* has been rarely met with but *russatus* is common and *basalis* may also occur. From the north-west *basalis* is recorded, and there *minutillus* is present; from the south (east and west) *plagosus* and *basalis* are both known. From Melville Island *minutillus* is received and rarely *basalis*. From Normanton *basalis* and *russatus*, the former predominating. The movements of these forms are as yet unknown.



H. Grönvold, del

Witherby & Co

$\frac{11}{12}$

LAMPROCOCCYX RUSSATUS.
(RUFIOUS-THROATED BRONZE CUCKOO).

LAMPROCOCCYX MINUTILLUS.
(LITTLE BRONZE CUCKOO).

LAMPROCOCCYX MINUTILLUS.

LITTLE BRONZE CUCKOO.

(PLATE 358. Lower figure.)

CHRYSOCOCCYX MINUTILLUS Gould, Proc. Zool. Soc. (Lond.), 1859, p. 128 ; Port Essington, Northern Territory.

Chrysococcyx minutillus Gould, Proc. Zool. Soc. (Lond.), 1859, p. 128 ; *id.*, Birds Austr. Suppl. pl. 56, 1st Sept., 1859 ; Mathews, Austral Av. Rec., Vol. I., pp. 22, 40, 1912 ; *id.*, Nov. Zool. Vol. XVIII., p. 295, 1912 ; Stone, Austral Av. Rec., Vol. I., p. 153, 1913.

Lamprococcyx minutillus Cabanis and Heine, Mus. Heine, Vol. IV., p. 15, note 1862 ; Gould, Handb. Birds Austr., Vol. I., p. 625, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 192, 1878 ; *id.*, *ib.*, Ser. II., Vol. II., p. 170, 1887 (N.W.A.).

Chalcococcyx malayanus Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 298, 1891 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 584, 1899 ; Mathews, Handl. Birds Austral., p. 58, 1908 ; *id.*, Emu, Vol. IX., p. 59, 1909 (N.W.A.) ; H. L. White, *ib.*, Vol. XV., p. 61, 1915.

Lamprococcyx malayanus North, Austr. Mus. Spec. Cat., No. 1, Vol. III., p. 27, 1911.

Chrysococcyx minutillus perplexus Mathews, Austral Av. Rec., Vol. I., p. 38, 1912 : Parry's Creek, North-west Australia.

Lamprococcyx minutillus minutillus Mathews, List Birds Austr., p. 158, 1913.

Lamprococcyx minutillus perplexus Mathews, *ib.*

Chrysococcyx minutillus melvillensis Zeitz, South Austr. Ornith., Vol. I., p. 14, 1914 : Melville Island.

Chalcococcyx minutillus Barnard, Emu, Vol. XIV., p. 43, 1914 (N.T.) ; H. L. White, *ib.*, Vol. XV. p. 61, 1915 ; *id.*, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

DISTRIBUTION. North-west Australia ; Northern Territory.

Adult male. General colour above glossy bronze-green including the entire back, wings and tail, darker and inclining to steel-blue on the head ; flight-quills pale brown on the inner-webs, which are white at the base and more or less tinged with buff ; central tail-feathers like the back, with a slight indication of a dark subterminal band which is well pronounced on the next three pairs, and are rufous on the inner-webs with a semicircular spot of white at the tips, the outermost pair fringed and more or less indented with white on the outer-webs, the inner-webs broadly barred with dark brown and white, an obsolete rippling of dark bars may be observed on the bronze-green pattern of the tail ; lores and feathers above and below the eye white ; throat and entire under-surface including the under wing-coverts white barred with brown.

THE BIRDS OF AUSTRALIA.

Eyes red, eyelids red; feet and tarsus leaden brown; bill black, base of lower mandible leaden-blue. Total length 145 mm.; culmen 12, wing 100, tail 58, tarsus 14. Figured. Collected on Parry's Creek, North-west Australia, on December 17th, 1908.

Adult female. Similar to the adult male, but eyelids brown.

Egg. Greenish-olive, lighter in colour than the eggs of *L. plagosus*. 19–20 mm. by 12–13.

Breeding-season. November and December.

THIS, probably the most select of Australian Bronze Cuckoos, was described by Gould and figured in the Supplement; he wrote in 1865: "Nothing further is known respecting this little Bronze Cuckoo than that it is a native of Port Essington, whence the only specimen I have yet seen was sent. The example alluded to is fully adult, and differs very considerably from every other species with which I am acquainted. It is one of the smallest species of the genus, yet it has as stout a bill as some of the larger kinds."

Nothing has yet been recorded of the habits of this species, and the confusion between this and the next species has proved very perplexing. Apparently it had not been again met with until Rogers procured two males in 1908, just fifty years after the type was secured. These I recorded in the *Emu*, Vol. IX., p. 59, 1909, as *Chalcococcyx malayanus*, writing: "I have compared these birds with Gould's type of *C. minutillus*, but find them more barred than that bird."

All its history is contained in its technical changes, which I summed up in the *Austral Avian Record*, Vol. I., p. 17, 1912, as follows:

"The little, and little-known Austral-Malayan Bronze Cuckoos are very perplexing, and I have to differ *in toto* with North's treatment of them. North recognises *L. malayanus* and in its synonymy includes *L. minutillus* Gould, and notes: 'Captain Shelley includes Gould's types of *Lamprococcyx russatus* from Cape York under Gray's name of *L. pœcilurus*, but the only adult specimen in the Australian Museum collection from that locality has the forehead and feathers over and behind the eye with distinctly whitish mottlings and is a typical *L. malayanus*. . . . Moreover, *Lamprococcyx russatus*, which Dr. Ramsay records from Cape York to Port Denison is, I am sure, only the young bird of *L. malayanus*. . . . Both specimens under this name in the Reference Collection are from Rockingham Bay, where *Lamprococcyx malayanus* is the common species.'" I then showed by reference to the original description that the name of *malayanus* was quite inapplicable to the group associated under that name by Shelley in the British Museum Catalogue.

The only notes seem to be those sent me by Mr. J. P. Rogers from Melville Island. "Cooper's Camp, October 28th, 1911. First of this species seen to-day. November 2nd, 1911: A second to-day. December 13th, 1911: Several birds were heard calling before this date but was not sure of the call until to-day, when I shot one as it was calling. December 20th, 1911: Fairly common

LITTLE BRONZE CUCKOO.

now. January 14th, 1912: None were seen or heard at the north side of the island, *i.e.*, ten miles S.E. of Snake Bay. February 6th, 1912: Cooper's Camp: Since returning here I have heard this species but seen none. Is not so numerous as in December, 1911." Zietz described the Melville Island form as a new subspecies, without, however, giving any notes upon its habits.

It has also been recorded by Barnard from the Northern Territory, but early records from Cape York and the Gulf country cannot be accepted. A peculiar factor, however, in connection with all these records is that probably two distinct species live in these localities, and consequently all the work must be done again.

From North-west Australia, Melville Island, and western Northern Territory only this species has been received: from the Gulf country and Cape York a few birds apparently belonging to this species have been recognised, though the majority belong to the next one.

The Melville Island series show the following features, which are exceedingly interesting, in view of the results seen in the case of the next species and the complications therewith. The Melville Island birds show scarcely any variation as to under-surface: the immature at first are unbarred; the next stage show few distant narrow bars on breast, becoming more numerous and extending on to the throat; and the under tail-coverts are barred; the female appears to be less barred than the male. The immature above is dull glossy greenish, developing into greenish-bronze, the head dark bluish-bronze, a white line more or less interrupted above the eyes; the wing has the inner webs of the primaries white with a faint salmon tinge, perhaps more pronounced in female. The banding on the tail-feathers varies according to age and sex, but not a great deal.

The north-western form is quite like these, but has a much more pronounced blue head and a stronger bluish tinge on the back. A bird from Port Darwin agrees fairly well with the Melville Island series.

The eyelids are marked as scarlet for male birds, but, with one exception, the females are given as having grey eyelids.

The exact relationship of this species to any other is perplexing, as I have one bird from Cape York (Utingu, May 16th, 1912 ♂) No. 13177, which agrees in the main with the above but differs in having the upper-surface coppery-bronze throughout, quite unlike the greenish and bluish-bronze of the foregoing: the head is only slightly darker, whereas the deeper coloration appears almost as a cap in the north-western form.

LAMPROCOCYX RUSSATUS.

RUFIOUS-BREASTED BRONZE CUCKOO.

(PLATE 358. Upper figure.)

CHRYSOCOCYX RUSSATA Gould, Proc. Zool. Soc. (Lond.), 1868, p. 76 : Cape York, Queensland.

Chrysococcyx russata Gould, Proc. Zool. Soc. (Lond.), 1868, p. 76 ; Mathews, Austral Av. Rec., Vol. I., p. 22, 1912 ; *id.*, Nov. Zool., Vol. XVIII., p. 296, 1912.

Lamprococcyx minutillus Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 57, 1875 (N.Q.) ; Ramsay, *ib.*, Vol. III., p. 255, 1879.

Chalcites minutillus Castelnau and Ramsay, *ib.*, Vol. I., p. 383, 1877 (N.Q.) ; Ramsay, *ib.*, Vol. II., p. 192, 1878.

Chalcites russata Ramsay, *ib.* ; *id.*, Tab. List Austr. Birds, p. 15, 1888.

Lamprococcyx russata Ramsay, Proc. Linn. Soc., N.S.W., Vol. III., p. 255, 1879.

Chalcites pæcilurus Ramsay, Tab. List Austr. Birds, p. 15, 1888.

Chalcococcyx pæcilurus Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 299, 1891 ; Mathews, Handl. Birds Austral., p. 58, 1908 ; Barnard, Emu, Vol. X., p. 240, 1910.

Lamprococcyx malayanus North, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. IX., p. 41, 1894 (N.Q.) ; *id.*, Austr. Mus. Spec. Cat. No. 1, Vol. III., p. 27, 1911.

Chalcococcyx malayanus Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 584, 1901 ; Barnard, Emu, Vol. XI., p. 25, 1911 (N.Q.) ; H. L. White, *id.*, Vol. XV., p. 61, 1915.

Chrysococcyx barnardi Mathews, Austral Av. Rec., Vol. I., p. 20, Jan. 2, 1912 : Dawson River, Queensland ; *id.*, Nov. Zool., Vol. XVIII., p. 296, 1912.

Neochalcites russatus Mathews, List Birds Austr., p. 157, 1913.

Neochalcites barnardi Mathews, List Birds Austr., p. 157, 1913.

Chalcococcyx russata Macgillivray, Emu, Vol. XIII., p. 163, 1914 (N.Q.).

DISTRIBUTION. North Queensland.

Adult male. General colour of the upper-surface bright bronze-green, including the head, back, wings, and tail, with more or less coppery reflections ; head slightly darker than the back ; median and greater upper wing-coverts and inner secondary quills narrowly edged with rufous, outer edge of wing more or less white, bastard-wing and primary coverts uniform brown, flight-quills brown on the inner-webs with rufous on the basal portion, becoming paler and inclining to whitish on the inner edges ; upper tail-coverts narrowly fringed with rufous, the lateral ones with two blackish spots on the outer-web which is fringed with white ; tail, the two central feathers fringed on both sides with rufous and a very slightly indicated dark subterminal band, the next pair rufous with a small space of bronze-green on the apical portion of the outer-web, a broad, dark subterminal band, the tip of the inner web tinged with rufous and an

RUFOUS-BREASTED BRONZE CUCKOO.

inclination to a whitish spot, the next two pairs similar but the bronze-green increasing in extent towards the base on the outer webs and a well pronounced white spot at the tip on the inner webs, the outermost pair rufous with four black marks, chiefly on the inner webs, the two nearest the base, however, extends on to the outer web, the two middle ones on the inner-webs are shadowed by incomplete white spots on their distal edges, and the subapical one by a well pronounced white spot, three slight indentations of white on the outer web towards the base, there is just a slight shade of bronze-green on the outer web at the tip ; sides of the fore-head and a line over the eye whitish with dark spots on some of the feathers ; fore-part of cheeks also whitish ; throat and entire under-surface white barred with bronze-brown or purple narrowly on the chin, throat, and under wing-coverts and more broadly on the breast, abdomen, sides of body and under tail-coverts ; sides of the neck washed with cinnamon rufous and much more faintly on the middle of the breast ; under-surface pale brown with a large rufous patch ; lower aspect of tail rufous, a broad dark subterminal band on the outer feathers, except the outermost, accompanied by a white spot at the tip of the inner-web, and four dark spots on the inner-webs of the outermost pair of feathers. Eyes light reddish-brown ; eyelid scarlet ; feet and tarsus brownish-black ; bill black, base of lower mandible brownish. Total length 157 mm. ; culmen 13, wing 92, tail 62, tarsus 15. Figured. Collected near Cairns, North Queensland, on the 29th of July, 1913.

Adult female. Similar to the adult male, but with the eyelids brown.

Immature. Uniform grey on the under-surface.

WHEN he described this species Gould made a long essay, and I here reproduce the bulk, as the remarks are so well applicable to-day, just fifty years afterward. " For some years past I have been treasuring up all the specimens I could obtain of the little Bronze Cuckoo of Cape York, under the impression that it would ultimately prove to be distinct from the species of the same form inhabiting New South Wales, Western Australia and Tasmania ; and I have now before me four, exhibiting a uniformity of characterisation which distinguishes them from all their congeners, however closely allied. To the unpractised eye they would appear to be identical with one or other of the previously described species ; and a cursory observer might suppose that the Australian members of this genus are identical with those inhabiting the islands to the northward of that country. This, however, I venture to say, is not the case, and I shall here point out in what particulars the bird from the Cape York peninsula differs from the rest. In size it is rather smaller than the one or more inhabiting the southern coast of Australia, but at the same time has a stouter bill, in which respect it somewhat resembles the Port Essington *Chrysococcyx minutillus* ; it differs, however, from that and every other species in the rich buff colouring of the under-surface of the wings or the basal portions of the primaries. Moreover a rufous tint pervades the upper-surface ; and the rufous hue of the tail is of a deeper colour, all the feathers except the two central ones, being of a rich rusty-fawn colour, and the outer one on each side only marked with spots or bands of black and white ; a similar

THE BIRDS OF AUSTRALIA.

mark of black and white also occurs on the tips of the three other lateral feathers. In some individuals (probably immature) the feathers of the scapulars are indistinctly barred near the shoulder with the bronzy-green and buff seen in some of the extra-Australian species of the genus, but which I have not observed to exist in any other examples from that country. It would not have been necessary to give such minute details respecting this little Cuckoo, were it not most difficult to diagnose the members of this genus of parasitic birds, respecting which we have yet much to learn, particularly with regard to the colouring of their eggs, which are frequently totally different from each other, and from those of the *Maluri*, *Acanthizæ* and other birds in whose nests they are deposited. The young, too, are most puzzling; for they do not appear to follow the law which obtains in the young of the true Cuckoos (genus *Cuculus*) and, instead of being strongly barred like them they are coloured uniformly, the outer tail-feathers only being barred with black and white."

Macgillivray (*Emu*, Vol. XIII., p. 163, 1914), wrote: "This, the most numerous of the small Cuckoos at Cape York, is easily recognised in the flesh by its bright scarlet irides and eyelids. It frequents for the most part the open forest and mangroves, though occasionally met with in the scrub. It was also noted on Bushy Island, near Cairncross Island, and on the Sir Charles Hardy group, in June and July, and was prevalent throughout the summer and autumn on the mainland. The usual foster-parents are the Gerygones, *G. personata* and *G. magnirostris*. On one occasion Mr. M'Lennan saw one of these Cuckoos following a pair of *G. magnirostris* in the mangroves, where the latter species usually nests. This attention was resented by the Gerygones who, after repeated assaults on the Cuckoo, succeeded in driving it away. In an adult male the soft parts are: Irides scarlet, eyelids bright scarlet, bill brownish-black, legs dark olive-brown. In a less mature bird the irides were pinkish-brown. Any eggs of a dark chocolate colour taken from nests of *Gerygone personata* or *G. magnirostris* are sure to be those of this bird."

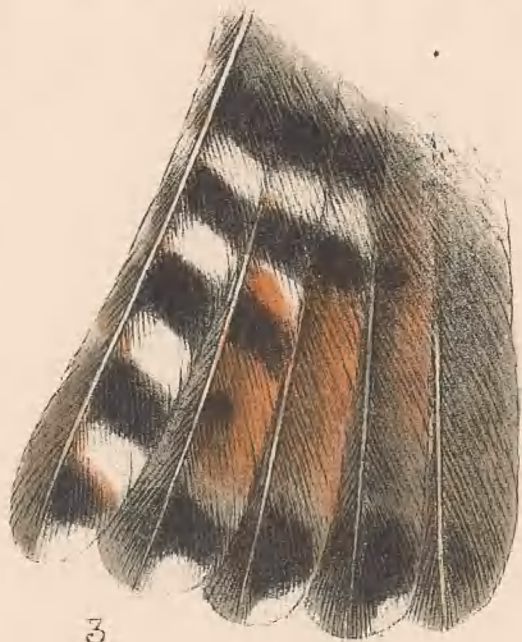
In 1912 I concluded: "*C. russatus* Gould was described from Cape York, and I have examined three of Gould's specimens from that locality, marked as types, in the British Museum. These cannot be confused with *C. minutillus* in any way, inasmuch as they belong to the *basalis* group, while *C. minutillus* is referable to the *lucidus* group. There is no russet on the tail of *C. minutillus* or the so-called *C. malayanus*, whereas *C. russatus* has every feather very russet, even more pronounced than in the tail of *C. basalis*. Shelley's reference of *C. russatus* to *C. pœcilurus* Gray was certainly near the mark, as the Cape York birds agree in the main with that species. They differ, however, in their lighter upper coloration and in the under-surface having less barring, and



1.



2.



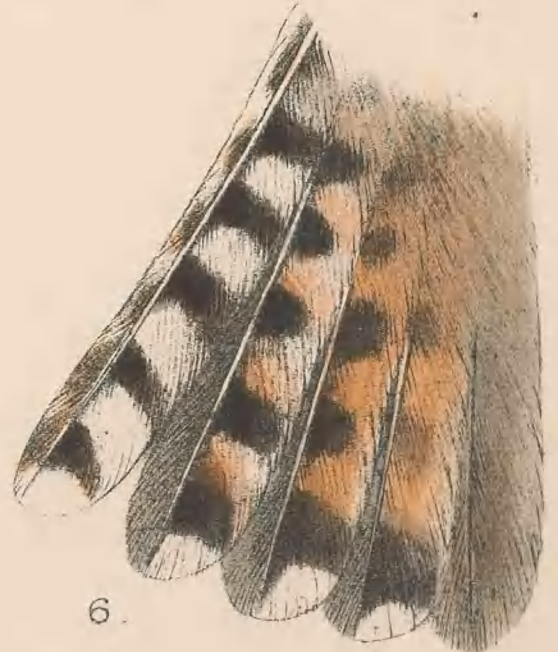
3.



4.



5.



6.

H. Grönvold, del.

Witherby & Co.

TAILS OF BRONZE CUCKOOS

FIG. 1. LAMPROCOCCYX PLAGOSUS

FIG. 4. LAMPROCOCCYX RUSSATUS.

FIG. 2. LAMPROCOCCYX LUCIDUS.

FIG. 5. NEOCHALCITES BASALIS.

FIG. 3. LAMPROCOCCYX MINUTILLUS.

FIG. 6. LAMPROCOCCYX BARNARDI.

RUFOUS-BREASTED BRONZE CUCKOO.

in the presence of the russet on the sides of the neck. All the Cape York birds have this russet on the breast, in some cases extending across as a band, while in the type of *C. pæcilurus* and other specimens from near the type locality, which I refer to *C. pæcilurus*, there is no indication of this russet coloration. At present I am unable to feel myself justified in referring *C. russatus* subspecifically to *C. pæcilurus*." Since then many specimens have been secured, and while the russet lower-throat band is not so constant, the form is very easily recognisable. It does not, however, belong to the *basalis* group, though its tail recalls that in coloration. The tail formation as well as the bill and general coloration prove it a *Lamprococcyx*, though the latter again recalls that of *basalis*. Broadbent in the *Emu* (Vol. X., p. 240, 1910) very definitely states: "At the Herbert River, North Queensland, this bird stays all the year. I have shot specimens at all times, but in the springtime it is more common. It is a noisy bird in the breeding time, and is always about the edges of scrubs. I have seen this bird in scores at Cape York in March."

The consideration of the Cape York birds has led to some curious results which are perplexing and inconclusive. The fixed item is the inner primary lining which is deeper than in *minutillus*, while the wing is longer. However, the young birds appear to be more narrowly barred underneath, lack the russet on the sides of the breast, have the tail more russet, the back greenish, and the wing apparently longer. The full plumaged birds have the wing shorter, the upper-surface coppery-bronze, the under-surface closely barred, while a russet tinge pervades the lower throat and is seen on the outer edges of the primaries. These two forms are not easily connected in my series, but I conclude they are the immature or first year plumage and the adult. The russet wing lining is present in both but is not so pronounced in the adult as in the immature.

The tail, however, differs considerably in coloration in these two stages. In the immature the pale russet predominates and the two outer feathers show a lot of white. In the adult deep russet is present and no white is seen in the outer feathers save at the tip. (See plate 359.)

This conclusion necessitates the acceptance of my *C. barnardi* as the immature of this species and, therefore, I attach the original description as follows.

"General coloration above, pale green with little bronze coloration; white eyebrow; primaries dark brown; under-surface white with narrow green crossbars on the throat and wide bronze bars on the abdomen distant and separate; inner-wing distantly barred. The outer tail-feathers have the outer web spotted alternately with white and brown, the inner alternately barred with black and white, the latter broader; the next pair have the outer,

THE BIRDS OF AUSTRALIA.

web uniform bronze-brown, the inner tipped with white followed by a large black spot, then a rusty bar, and this repeated ; the next pair have the same style of coloration, the white spot decreasing ; in the fourth pair the white spot of obsolete and the black diminishing, so that the russet predominates ; the central pair are uniform pale bronze-green.

“The bill is very long and narrow, the exposed portion measuring 16 mm. Wing measurement of type 107 mm. Type No. 1464 ♂, Coomooboolaroo, Dawson River, Queensland.

“This species differs from both the *C. plagosus* group and the *C. basalis* group. It approaches the latter in upper coloration, but is entirely different in the under-surface barring ; the throat is cross-barred, whereas in *C. basalis* it is obscurely longitudinally streaked. It differs from the former in its general coloration and especially in its tail coloration.”

This was drawn up when only a few specimens of *russatus* were available, and the long wing disagreed with those, as did almost every other particular. The bill is long and narrow, whereas in the adult it is long and broad. Owing to the variation observed in the Cape York birds it is not possible to determine exactly the subspecific forms of the species, but as specimens are also available from Normanton it seems best to admit two subspecies :

Lamprococcyx russatus russatus (Gould).

Cape York.

Lamprococcyx russatus barnardi (Mathews).

North Queensland (Gulf Country to mid-Queensland).

GENUS—EUDYNAMYS.

EUDYNAMYS Vigors and Horsfield, Trans. Linn. Soc.
(Lond.), Vol. XV., p. 303, 1827 Type *E. orientalis*.

Also spelt—
Eudynamis Lesson, Manuel d'Ornith., Vol. II., p. 123, 1828.
Eudinamys

Dynamene Stephens in Shaw's Gen. Zool., Vol. XIV.,
p. 211, 1826. (Not *Dynamene* Leach, 1818.) .. Type *E. maculatus*.

MEDIUM-SIZED Eudynamytine birds with strong short decurved bills, somewhat conical, broad at base, long wings, long tail, and short strong legs and feet.

The obvious feature of this group is the linear nostril.

The bill is short, culmen decurved, tip sharp and pointed, not hooked, rather deep, broadest at base, rather conical; the lower mandible straight, somewhat flattened. The nostrils are linear slits, placed low down at the base of the culmen, quite unlike the tubular nostrils of the preceding genera. The wing is long, the first primary short, not much more than half the length of the third which is longest, exceeding the fourth and fifth, which are longer than the second, while the first is shorter than the secondaries.

The tail is long and of a rounded wedge-shape, about equal to the wing length. The tarsus is short and very thick, the front surface bearing large scutes, behind covered with reticulate scales. The middle toe is long, the fore inner toe shorter than the back outer, but longer than the inner hind one, the toes being in pairs. The claws are normal, sharp and curved.

While this genus is very well marked, I had at first considered it an aberrant Cuculine bird, but I now accept it as representative of a distinct family. The internal characters are so peculiar as to cause its association with *Scythrops*, a genus superficially quite unlike.

Order CUCULIFORMES.

No. 413.

Family EUDYNAMYTIDÆ.

EUDYNAMYS ORIENTALIS.

KOEL.

(PLATE 360.)*

CUCULUS ORIENTALIS Linné, Syst. Nat., XII, Ed., p. 168, 1766: "India" = Amboina.

Cuculus cyanocephalus Latham, Index Ornith. Suppl., p. xxx., 1801: New South Wales. Blueheaded Cuckoo, Latham, Gen. Synops. Birds Suppl., II., p. 137, 1801.

Cuculus cyanocephalus Latham, Index Ornith. Suppl., p. xxx., 1801.

Flinders Cuckoo Latham, Gen. Hist. Birds, Vol. III., p. 308, 1822.

Eudynamys flindersii Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 304, 1827.

Eudynamys flindersii Vigors and Horsfield, Trans. Linn. Soc. (Lond.) Vol. XV., p. 305, 1827: New South Wales; Gould, Birds Austr., pt. XXX. (Vol. IV., pl. 91), 1848; *id.*, Handb. Birds Austr., Vol. I., p. 632, 1865; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 601 (N.Q.).

Eudynamis australis Swainson, Anim. in Menag., p. 344, 1838: New South Wales.

Eudynamis cyanocephala Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 192, 1878; *id.*, *ib.*, Vol. III., p. 257, 1879; *id.*, *ib.*, Ser. 2, Vol. II., p. 170, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 15, 1888; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 324, 1891; Hall, Key Birds Austr., p. 59, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 586, 1901; Berney, Emu, Vol. II., p. 211, 1903 (N.Q.); Vol. IV., p. 46, 1904 (N.Q.); Vol. VI., p. 45, 1906 (N.Q.); Mathews, Handl. Birds Austral., p. 58, 1908; *id.*, Emu, Vol. IX., pp. 8-59, 1909 (N.W.A.); Campbell and White, *ib.*, Vol. X., p. 197, 1910 (Q.); Broadbent, *ib.*, p. 240 (N.Q.); North, Austr. Mus. Spec. Cat. No. 1, Vol. III., p. 28, 1911; Barnard, Emu, Vol. XI., p. 25, 1911 (N.Q.); G. F. Hill, *ib.*, Vol. XII., p. 256, 1913 (N.T.); Macgillivray, *ib.*, Vol. XIII., p. 163, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 43, 1914 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 220, 1917 (N.T.).

Eudynamis orientalis cyanocephalus Hartert, Nov. Zool., Vol. XII., p. 218, 1905 (N.W.A.); Mathews, Austral Av. Rec., Vol. I., p. 22, 1912; *id.*, Nov. Zool., Vol. XVIII., p. 296, 1912; *id.*, List Birds Austr., p. 158, 1913.

Eudynamis orientalis subcyanocephalus Mathews, Austral Av. Rec., Vol. I., p. 21, 1912: Parry's Creek, North-west Australia; *id.*, Nov. Zool., Vol. XVIII., p. 296, 1912; *id.*, List Birds Austr., p. 159, 1913.

Eudynamis orientalis flindersii Mathews, Austral Av. Rec., Vol. I., p. 22, 1912; *id.*, Nov. Zool. Vol. XVIII., p. 296, 1912; *id.*, List Birds Austr., p. 159, 1913.

* The plate is lettered *Eudynamys cyanocephalus*.



H. Grönvold, del.

Witherby & Co

$\frac{1}{2}$
EUDYNAMYS CYANOCEPHALUS.
(KOEL).



KOEL.

DISTRIBUTION : Victoria ; New South Wales ; Queensland ; Northern Territory ; North-west Australia.

Adult male. General colour both above and below glossy blue-black ; under-surface of quills blackish-brown. Eyes red. Feet and tarsus leaden-blue with a tinge of olive. Bill olive-grey with the base of the culmen and nostrils blackish-brown. Total length 452 mm. ; culmen 25, wing 214, tail 210, tarsus 34. Figured. Collected on Parry's Creek, North-west Australia, on the 20th of October, 1908.

Adult female. Crown of head, upper hind-neck, and upper portion of ear-coverts glossy blue-black ; lower hind-neck and mantle similar but rather paler and the feathers marked with white ; entire back, wings and tail bronze-brown spotted or barred with white—the white markings take all kinds of peculiar forms, sometimes spots of varying shapes which occur on the margins of the feathers, while others are close to the shafts, the markings on the flight-quills sometimes form oblique bars, at others more or less curved, those on the tail-feathers are similar in shape and terminate with white tips ; chin and throat blue-black with white tips to the feathers on the middle portion, the lateral portion uniform and extending towards the sides of the neck ; a line running from the lores to the sides of the neck ochraceous like the fore-neck, breast, abdomen, sides of body, under tail-coverts, axillaries and under wing-coverts narrowly barred with dark brown on all, except the line on the cheeks ; abdomen and under tail-coverts less ochraceous and inclining to white ; under-surface of quills pale brown marked with white, more profusely at the base, and becoming obsolete on the terminal portion ; lower aspect of tail greenish-brown profusely barred with white. Wing 206 mm. Figured. Collected on Parry's Creek, North-west Australia, on the 23rd of November, 1908.

Nestling. Head buff, rest of upper-surface and wings buff with narrow dark-brown bars. Under-surface white with brown bars.

As the bird gets bigger a black stripe appears below and behind the eye ; a blackish patch on the crown of the head and another between the wings. In the next stage the black on the upper surface has increased and covers the head, back, rump and upper wing-coverts. The throat also shows the black.

Egg. Ground-colour pinkish. Sparingly spotted with irregular markings, thickest about the larger end, of reddish-purple and lavender. 34 mm. by 23-25.

Breeding-season. October to January or February.

IN their exposition of the Australian Birds in the Museum of the Linnean Society, Vigors and Horsfield introduced many new genera and amongst them *Eudynamys* for *Cuculus orientalis* of Linné, to which they referred specimens from Australia, writing : " These birds, which now generally are considered the sexes of one species, appear to be but accidental visitors in the colony. At least Mr. Caley informs us that he never met with more than two individuals of the male and one of the female. The male specimen in the Society's collection seems to be a young bird changing to the adult plumage. It has several pale ferruginous feathers on the lower parts of the body, and it has a single ferruginous feather streaked with black among the secondary quill-feathers of the right wing, which forms a striking contrast with the deep black of the rest. The corresponding feather on the left wing was lost, as Mr. Caley tells us, by the shot

THE BIRDS OF AUSTRALIA.

striking the wing. This bird had berries of *Cassytha* in its stomach. The native name of the male is *Cowhat*, of the female *Bellinging*."

They then added *Eudynamys flindersii* from Latham's MSS. for an immature specimen, and this name was utilised by Gould when it was discovered that the Australian form differed from the East Indian true *E. orientalis* Linné.

In 1843 when Gray examined the Watling drawings he recognised a painting of the female of this which was the basis of *Cuculus cyanocephalus* Latham. Peculiarly enough in his "Handbook" Gould recognised the identity, but retained the name *Eudynamis flindersi*, apparently from forgetfulness, as he wrote: "It will be seen by the list of synonyms quoted above that the young and the adult have been considered as distinct species, and that the specific name *Flindersi*, which I have retained from its priority, has been applied to the bird in one of the earliest stages of its existence after leaving the nest, when the prevailing tints of its plumage are rufous-brown, with transverse markings of dark brown; from this state until the bird attains maturity, many parti-coloured changes of plumage occur; but whether the sexes when fully adult are alike in colouring, I have not been able to ascertain; I am inclined to think they are not, and that the specimens having the upper-surface regularly spotted with white on a bronzed olive ground and with zigzag marks or bars on the buffy-white of the under-surface, are adult females.

"This bird is very abundant in all the brushes of the east coast, from the River Hunter to Moreton Bay, and thence round to Torres Straits; it was also found in considerable abundance by Sir George Grey on the north-west coast. I did not meet with it myself, and I regret to say that no information has yet been obtained respecting its habits and manners. I should be glad to know if it be parasitic or not, and also the size and colour of its egg."

The note attached to the Watling drawing reads: "This is the only bird hitherto found in the country of New South Wales. Another of a similar form and magnitude, but of a glossy black colour, was taken at the same time, but whether of a different genus or the male and female of this species Mr. White was not able to determine. In make and character it resembles the Anomalous Hornbill; the colour is more brown."

This note is of interest as showing that Mr. White was in touch with Watling, but whether he supervised him or not is not yet known. It is also curious to note the reference to the "Anomalous Hornbill," because that bird is now closely associated with this, though Latham, the systematic ornithologist of the period, did not so consider it.

Mr. Thos. P. Austin's notes read: "Although I have never seen or heard of the Koel being seen anywhere near this district (Cobbora, New South Wales), I have met with them along the coast of New South Wales, near Port Stephens,

KOEL.

where their peculiar loud 'coo-ee' call could be heard at intervals throughout the day and late into the night. In that district they are locally known as the Christmas-bird, owing to their arrival about that period, 'so I was informed'; however, upon my last visit to that locality on October 26th, 1912, these birds were there then, and their lives appeared to be made quite miserable by the Friar-birds chasing them whenever they saw them; they gave them, very little peace. I have their eggs in my collection with eight species of foster-parents, and from the following dates upon which these eight sets were taken, they appear to be late breeders: November 6, 1909, November 21, 1909, November 29, 1910, December 7, 1908, December 28, 1909, January 4, 1905, January 5, 1911, and February 4, 1914."

Berney in the *Emu*, Vol. II., p. 211, 1903, wrote: "I have only come across the Koel about Homestead [on the Campaspe River, Queensland], where it was fairly common during the summer of 1900 and 1901. I first heard its loud, clear, indescribable call on 22nd December, and my latest date is 14th March. The birds confined themselves to the timber along the river and creeks, never in my experience being seen out on the ironbark ridges. During January they were living on the hard, green, unripe fruit of a wild fig that grew on the river's bank." From the Richmond district he added (*Emu*, Vol. IV., p. 46, 1904): "The Koel is a rare bird on this part of the Flinders River, being but seldom heard; its cry, 'co'ey, co'ey, co'ey, co'ey, co'ey' uttered most monotonously and finished off now and again with 'wo wo wo wo wo wo,' is so strange and striking that it could not be passed over without being noticed. In 1902 I first heard in on 17th December, and in 1903 on 27th November. The month of January is my last date. Mr. Smedley writes me from Homestead that the Koels had all left that district by 18th May, 1903, and did not show up again till 26th August the same year."

Captain S. A. White has written me: "Have met with Koels in nearly every locality I have visited along the Queensland coast-line, also along the New South Wales coast as far down as the Hunter River. I took a male on the Capricorn Group (Tryon Island) and saw a female. This is a very noisy bird at certain times of the year, and I met with them in great numbers on Mount Tambourine, Queensland."

Mr. Edwin Ashby states: "I have never shot this bird, although I saw it in the Mallanganee district, New South Wales, in November 1912. I received a beautiful male from Port Keats, in the Northern Territory, sent me by Mr. C. E. May."

Apparently a bird was seen in Victoria on May 13, 1908, and recorded by E. J. Christian, but it is a northern species and he ascribed its southern appearance to the long drought.

THE BIRDS OF AUSTRALIA.

Mr. J. P. Rogers' notes made in the north-west at Parry's Creek read : "October 15, 1908. Late to-night (9-30 p.m.) I heard one of these birds whistling. It is the first heard since I landed. October 19, 1908. Saw several males of this species. They are skulking birds : when perched among thick branches they creep about very quietly. This species is rare on the Fitzroy, as I never secured a single specimen there. These are the first seen here this year. October 30, 1908. One bird passed the camp at 11.30 p.m. whistling loudly. Next day a bird was whistling near my house in the morning and hurried round all day. The attraction was a fig tree near the camp. November 13. These birds are not so numerous here now. March 18, 1909. One whistling on the creek to-day. April 16, 1909. None seen since March 18. They appear to move away in March and are only seen in the wet season."

Macgillivray's notes from North Queensland (*Emu*, Vol. XIII., p. 163, 1914) read : "The Koel was first met with on the Cloncurry River early in February. One young bird which was being fed by a pair of Yellow-throated Miners, and was obtained for a specimen, was, in its barred plumage, even more beautiful than the adult of either sex. In this bird the irides were light stone colour, feet and legs lead-colour. Stomach contents, grasshoppers and beetles. In a young male the irides were orange, in adults ruby-scarlet."

The foster-parents of this Cuckoo, according to H. L. White (*Emu*, Vol. XIV., p. 154, 1915), are : "*Colluricincla harmonica*, *Grallina cyanoleuca*, *Melloria quoyi*, *Entomyzon cyanotis*, *Philemon argenticeps*, *Neophilemon buccroides*, *Tropidorhynchus corniculatus*, *Microphilemon orientalis*, *Mimeta sagittata*, *Sphecotheres flaviventris*, *Dicruropsis bracteatus* and *Ptiloris paradisea*."

Though given specific value in the *Catalogue of the Birds in the British Museum*, Vol. XIX., the Australian Koel has since been regarded as only subspecifically separable from the Moluccan species, and its distribution appears to confirm this rating. The males are almost inseparable in coloration and size, but subspecific characters can be seen in the females. The change from immature to adult male plumage is undertaken so gradually that a series can be procured showing birds in every stage from a few black feathers to almost all black, and they show peculiarly well how moult takes place so very irregularly in tropical climes, birds showing different stages at the same date.

The subspecies admitted are *Eudynamys orientalis cyanocephalus*, Queensland, New South Wales, Victoria (accid.)

Eudynamys orientalis subcyanocephalus, Northern Territory, North-west Australia.

GENUS—SCYTHROPS.

SCYTHROPS Latham, Index Ornith., Vol. I., p. 141,

1790.. .. Type *S. novæhollandiæ*.

LARGEST Scythropine birds with huge bill, grooved on the sides of the upper mandible, long wings, long tail and very short legs and small feet.

The obvious character of this genus is the peculiar bill.

The bill is massive, broad at the base, where the culmen shows a keel; the upper mandible is deep, sides convex, grooved and ridged, three grooves on each side, hence the vernacular "Channel Bill"; the tip is decurved, sharp and pointed, not hooked; the edges obscurely serrate anteriorly; the lower comparatively shallow, gonys very long. The nostrils appear as small circular holes placed low down at base of culmen in the lowest ridge. The lores more or less naked.

The wing is long, the first primary short, about half the length of the third, which is longest, the fourth exceeding the second and fifth which are subequal, these four constituting the tip of the wing; the first being about equal to the rather short secondaries.

The tail is long, about four-fifths the length of the wing, the feathers broad in shape, rounded, the outer feather about three-fourths the length of the middle ones.

The tarsus is very short and thick, in front a few large scutes, behind small reticulate scales covering the surface. The middle toe is long, equal to the tarsus in length, hind inner toe very short, the other two intermediate in size and subequal, the claws short and curved. This genus, which I have given family rank, is quite unlike any other and the internal features are also peculiar, so that at present we have little clue to its evolution.

SCYTHROPS NOVÆHOLLANDIÆ.

CHANNEL BILL.

(PLATE 361.)

SCYTHROPS NOVÆHOLLANDIÆ Latham, Index Ornith., Vol. I., p. 141, 1790 : New South Wales.

Psittaceous Hornbill Phillips, Voy. Botany Bay, pl. opp. p. 165, 1789.

Scythrops novæhollandiæ Latham, Index Ornith., Vol. I., p. 141, 1790 ; Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 306, 1827 ; Gould, Birds Austr., pt. XXIX., Vol. IV., pl. 90, 1847 ; *id.*, Handb. Birds Austr., Vol. I., p. 628, 1865 ; Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. I, p. 383, 1877 (Q.) ; Ramsay, *ib.*, Vol. II., p. 192, 1878 ; *id.*, *ib.*, Vol. III., p. 258, 1879 ; *id.*, Tab. List Austr. Birds, p. 15, 1888 ; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 330, 1891 ; Beddard, Proc. Zool. Soc. (Lond.), 1898, p. 44 ; Hall, Key Birds Austr., p. 59, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 588, 1901 ; A. G. Campbell, Emu, Vol. II., p. 16, 1902 (Vic.) ; Berney, *ib.*, 211, 1903 (N.Q.) ; H. L. White, *ib.*, Vol. III., p. 233, 1904 (N.S.W.) ; Berney, *ib.*, Vol. IV., p. 46, 1904 (N.Q.) ; Hartert, Nov. Zool., Vol. XII., p. 219, 1905 (N.W.A.) ; Berney, Emu, Vol. VI., p. 45, 1906 (N.Q.) ; *id.*, *ib.*, Vol. VII., p. 87, 1907 (N.Q.) ; Ingram, Ibis, 1907, p. 402 (N.T.) ; Mathews, Handl. Birds Austral., p. 58, 1908 ; *id.*, Emu, Vol. X., p. 110, 1910 (N.W.A.) ; Broadbent, *ib.*, Vol. X., p. 240, 1910 (N.Q.) ; North, Austr. Mus. Spec. Cat. No. 1, Vol. III., p. 31, 1911 ; Barnard, Emu, Vol. XI., p. 25, 1911 (N.Q.) ; G. F. Hill, *ib.*, Vol. XII., p. 256, 1913 (N.T.) ; Macgillivray, *ib.*, Vol. XIII., p. 164, 1914 (N.Q.) ; Barnard, *ib.*, p. 207, 1914 (N.T.) ; *id.*, *ib.*, Vol. XIV., p. 43, 1916 (N.T.).

Anomalous Hornbill White, Journ. Voy. N.S. Wales, pl. opp. p. 142, 1790.

Scythrops psittaceus Kerr, Animal Kingdom, pt. 1, p. 619, 1792 : New South Wales.

New Holland Channel Bill Latham, Gen. Synops. Birds Suppl., II., p. 96, pl. 124, 1801.

Scythrops australasiæ Shaw, General Zool., Vol. VIII., p. 378, 1811 : New South Wales.

Scythrops australis Swainson, Classif. Birds, Vol. II., p. 299, 1837 : New South Wales.

Scythrops novæhollandiæ novæhollandiæ Mathews, Nov. Zool., Vol. XVIII., p. 296, 1912 ; *id.*, List Birds Austr., p. 159, 1913.

Scythrops novæhollandiæ neglectus Mathews, Nov. Zool., Vol. XVIII., p. 297, 1912 : Parry's Creek, North-west Australia ; *id.*, List Birds Austr., p. 159, 1913.

DISTRIBUTION : Queensland ; New South Wales (Victoria and Tasmania) ; Northern Territory ; North-west Australia.



Witherby & C^o

$\frac{1}{3}$
SCYTHROPS NOVÆHOLLANDIÆ.
(CHANNEL-BILL).

H Goodchild, del

CHANNEL BILL.

Adult male. Back, wings, and tail slate-grey with an olive tinge and dark brown margins to the tips of the feathers, many of which are emarginate; inner-webs of primary and secondary quills dark brown, becoming paler towards the base; middle tail-feathers like the back, with a broad subterminal band of black and narrowly tipped with white, the lateral feathers somewhat browner and largely toothed with white on the inner-webs—the white margined with dark brown on the sides towards the base—a wide subterminal band of black and broadly tipped with white; entire head and neck all round ash-grey somewhat paler on the throat, fore-neck and upper-breast; lower-breast, abdomen, under tail-coverts, sides of body, axillaries, and under wing-coverts creamy-white barred with pale ash-grey, some of the bars on the lower flanks and under tail-coverts dark brown; under-surface of the quills grey with dark brown on the terminal portion; lower aspect of the tail grey with a wide subterminal bar of dark brown and tipped with white, much more broadly on the lateral feathers, inner-webs of outer feathers notched with white and barred with brown. Eyes red, skin round the eyes, lores, ring round the nostril and a line from the nostril round the lower mandible red. Feet and tarsus leaden-grey. Culmen and sides of upper-mandible pale brown, balance of bill a mixture of grey and brown. Total length 670 mm.; culmen 86, wing 350, tail 280, tarsus 40. Figured. Collected on Parry's Creek, North-west Australia, on the 18th of December, 1908.

Adult female. Similar to the adult male.

Immature. Have the tips of the feathers on the wings and back buff-coloured. All the feathers of the tail tipped with white. The under-surface much more barred and the grey of the head and neck blotched with buff.

Nest. The egg is placed in a nest of *Corvus* or *Strepera*.

Egg. Ground-colour yellowish-brown, spotted and blotched, especially at the larger end with brown and lavender—47 mm. by 30.

THIS extraordinary bird was secured by the first settlers at Sydney, New South Wales, and was simultaneously figured in White's Journal, and Phillips' Voyage, where it was called Anomalous Hornbill and Psittaceous Hornbill. At the same time Latham technically described it and instituted for it a new genus, and Latham's name has been in use ever since. When Latham examined the Watling drawings he found a long account which he transcribed in the Supplement referring to the authority as Mr. White. It is thus possible that these Watling drawings were prepared under the supervision of Mr. White, but at present we have only Latham's word for this, though certainly the reading of the item seems to favour that view. As it is the earliest, and rather a full account, I here include it as it was written near Sydney between 1788-1792:

“The native name *Gæ-re-e-gang*. This singular bird is by no means numerous about us, even in the months that it is seen, which are only three or four times in a year. It generally makes its appearance in October, and is seldom seen unless in the mornings and evenings; they are sometimes seen seven or eight together, but oftener in pairs; both on the wing and when perched they make a strange loud screaming noise, not unlike that made by the common cock or hen, when they perceive a hawk or any other bird of prey hovering over them. Their errand to this part of New South Wales seems to be merely

THE BIRDS OF AUSTRALIA.

for the purpose of pairing, building their nests, and bringing forth their young, which when done, concludes their visit, and they migrate or depart to some other quarter about January where they frequent the other part of the year we know not. In the crop and gizzard of several which I shot I found the seeds of the red-gum and peppermint trees, which I believe to be their principal food. The bill, which is strong, horny, and pointed, is well adapted for breaking and dividing the capsules, as is the tongue, which is small and pointed, and of a hard cartilaginous substance, for picking out the seeds. In some of their stomachs I found the capsule or pericarpium whole, which they not unfrequently swallow without waiting to pick out the seeds. I have also found in their stomachs the wings and legs of some kinds of beetles, but in a quantity that bore no proportion to the capsule and seed already spoken of. The bill (whose upper-mandible is very pointed and round or bent at the extremity lapping over the under) and legs are of a lead colour, the former rather inclining to a brown; the toes are placed two forward and two behind, the two hind ones opening so as to admit the two before to be placed between them when the bird is sitting or perched on a limb or branch of a tree not too large for the toes to grasp or go round. The bird from which this drawing is taken was a female with a very distinct ovarium, but the eggs not formed. It measures from the tip of the bill to the white extremity of the tail 2 feet, and from the tip to tip of each wing exactly the same. The tail (which it sometimes displays like a fan) is not very short of the length of the body, and gives it in flight or sitting a very majestic appearance; the legs are rather short for the size of the bird (whole body is the size of a Crow), and partakes much of the Parrot kind. The natives know very little about its habits, haunts, etc., etc. However, they consider its appearance an indication of wind and blowing weather, and that its frightful scream is through fear, as it is not a bird of very active or quick flight. Nothing in nature can be more fiery or fierce than the uncommon clearness of the pupil eye. I had a wounded one two days alive, but could not get it to eat; it bit everything that approached it very severely."

When Latham added the above he proposed for his genus *Scythrops* the vernacular, Channel bill, calling the species the "N. Holland Channel bill" and this name is generally used.

Gould remarked that as he had but few opportunities of observing the species, he transcribed Latham's account taken from the above, and then added: "In some notes by the late Mr. Elsey on the birds observed by him during Mr. Gregory's Expedition, and which were kindly made for my use, he says: 'This bird appeared on the northern side of the ranges. It settled in a tree close to our camp, and for five minutes at a time pumped out its awful notes. Sometimes it was quite indifferent to our presence, but generally it was very

CHANNEL BILL.

shy. I have never seen it on the ground, but always at the tops of large trees. One, shot by Mr. Gregory and preserved, proved to be an incubating female; it contained several eggs, one nearly matured, and from the state of the oviduct another must have been recently extruded. Its habits seem to indicate that it is parasitic, and this view is confirmed by Lady Dowling informing me that a young specimen, kindly presented to me by her ladyship, was one of two taken from a branch of a tree while being fed by birds not of its own species.' "

Mr. Thos. P. Austin, writing to me from Cobbara, New South Wales, says: "A very rare visitor to this district, but occasionally I have seen small flocks of from four to five, and my attention has always been drawn to them by their loud peculiar notes, which can be heard at a great distance, and are quite impossible to describe. During the spring of 1914, while riding through a fairly thick scrub, in large ironbark timber, I heard one of these birds. It flew almost directly over me, and, hanging on to the tip of its tail, was a Friar-bird, and it held on with its beak all the time they were in sight of me. They are usually known by the name of Rain-Bird."

Keartland wrote from N.W. Australia: "At the approach of the tropical rain in January the *Scythrops* made its appearance in the early morning, always coming from the west and going east. Their loud notes, which they utter when flying, were always noticed by the Crows at our camp, which at once assembled and attacked the intruder. Then a battle royal ensued. Two or more Crows attacked simultaneously, and the sharp snap of their bills might be heard for some distance. When the Channel bill was chased for about a mile the Crows returned to their quarters. On Mount Campbell a pair of *Scythrops* frequently resorted to a fig tree to feed. I shot the female on 3rd March, and found the stomach full of figs. The ovaries were well developed, and contained three yolks varying in size, one being as large as a small cherry, the other two slightly less. Near the Margaret River the natives took two young ones from a Crow's nest near the Homestead, which the *Scythrops* had frequently visited. They are locally known as 'Stormbirds.' "

H. L. White (*Emu*, Vol. III., p. 233, 1904) recorded from Scone, in New South Wales: "The Channel bill (*Scythrops novæhollandiæ*) has been unusually plentiful in this district during the spring, and has been as reliable as ever in the matter of weather changes—in fact, the shearers look upon the bird as a real prophet of evil. On 11th November I shot a female containing four immature eggs, the largest being half an inch in diameter, and am inclined to think that the *Scythrops* feeds at night, as the one I shot was flying past at 5 a.m., and its stomach was then full of wild figs, and I know of no figs growing nearer than ten miles from here. It was just sunrise when I shot the bird, so it follows that it must have been feeding before daylight."

THE BIRDS OF AUSTRALIA.

F. L. Berney in his notes on Queensland birds (*Emu*, Vol. IV., p. 46, 1904) adds: "The Channel bill or Stormbird, as it is universally called out here, was first heard in 1902, on 3rd December, and in 1903 on 6th November, while Mr. Smedley reports their first appearance at Homestead, on the Campaspe River, on 11th September in 1903. My latest date in 1903 is 4th April, while in 1904, although they had practically all gone by the first week in April, yet I heard one on the 29th of that month—an exceptionally late date—and on my expressing surprise, I was told that the young *Scythrops* had been reared in a Crow's nest close by, and was still following its foster-parents about."

Berney later wrote me: "I have never seen this bird's eggs in any other nest than that of *Corvus coronoides*. I have, more than once, seen two of this Cuckoo's eggs in one nest. Last season (1909) I found a Crow's nest containing three *Scythrops*' eggs. I once saw two young *Scythrops* and one Crow in the same nest. The latter withstood all the attempts of the two interlopers to put him out. When I saw him last he was well and hearty, and would, in a couple of days more, be able to leave the nest on his own account."

A good note is given by Broadbent (*Emu*, Vol. X., p. 240, 1910): "At Cardwell, the Channel bill is a migratory bird here in October. It is fondest of hill scrubs. In the Gowrie Creek scrubs these birds lay in the nests of *Strepera graculina* (Pied Crow-Shrike). At the head of the Murray River, 25 miles out of Cardwell, in January, in the scrubs at the base of the mountains, Channel bills were numerous. They appeared to be collecting together for migration purposes. They are high fliers, and keep in the highest trees in the forest and scrub, feeding on small figs. The figs appear to be their favourite diet, but they eat insects, and even meat (tame ones). In the breeding-time these birds are flying about and screeching all night—in fact, they appear to be more lively in the night than in the daytime. I am fully convinced that they feed their young all night, and the foster-parents all day. A pair of these birds lived on Mount Graham, near where I was staying, at Mr. Richard Lee's, Gowrie Creek Gorge. In the daytime they would not be heard, but after dark, until dawn, they were busy all the time, flying from peak to peak up the mountain, and screeching the whole time. In the daytime the Crow-Shrikes were at work, and no Cuckoos were to be seen or heard. At Cape York I have seen specimens of these birds in February. I shot four feeding in a fig tree—two adult and two young—the latter being as large as the old ones. At Cape York in March all kinds of Cuckoos were quite common. Their stay there was about a month, and then they all disappeared except *Chalcococcyx russatus* and *Cacomantis tymbonomus* (*variolosus*). They were nearly all young birds."

Macgillivray's notes (*Emu*, Vol. XIII., p. 164, 1914) are also good: "These birds, known in the Gulf Country as Stormbirds, on account of their first

CHANNEL BILL.

appearing with the thunderstorms which usher in the wet season, were common during the summer months. On 8th February, 1910, Mr. M'Lennan noted eight in one tree. On 12th March, 1910, he made the following note: 'Struck a channel of the Gilliat River, and found a Short-billed Crow's (*C. bennetti*) nest, containing five young Channel bills almost ready to leave the nest. I took two for specimens. They were all in series—there seemed to be about two days between each of them, and one would be led to believe that the eggs had been laid by the same bird.' As two young Channel bills have often been seen by several reliable observers being fed by Crows or other foster-parents, it seems certain that they do not eject one another from the nest. At the same time it is equally certain that they eject the progeny of their foster-parents. How is it that such nestlings are able to distinguish between their own kith and kin and those of the foster-parent, especially, as seems to have been the case with the five young Cuckoos, where they were hatched out in succession?

Unfortunately, as darkness overtook Mr. M'Lennan on this occasion before he could regain his camp, and he had to spend the night under a tree, the stormy weather spoiled the skins, but a description was made of one, a male: 'Head fawn-colour; back, tail, and wing-coverts mottled fawn, grey, and brown; tail and wing-feathers barred; under-surface dirty white. Irides brown, bill reddish-brown. No trace of a channel on the bill. Legs lead-colour. Stomach contents, caterpillars, beetles and grasshoppers.' Another Crow's nest contained one young Channel bill, and a third an egg of the Channel bill with one of the Crow. The loud screeching call of this species could be heard at any hour of the day or night. At Cape York they were seen only occasionally."

Ramsay, writing in 1875 of the Birds of North Queensland, wrote: "These species (*Scythrops novæhollandiæ*, *Eudynamis flindersi*, *Centropus phasianus*) are all common enough throughout the whole district, the *Scythrops* usually met with flying about the tops of high trees in companies of five to eight in number; they have a loud, harsh guttural croak, which is most usually heard early in the morning. The *Eudynamis* frequents fruit-bearing trees of every description, and feeds on numerous species of berries found in the scrubs, occasionally visiting gardens in the neighbourhood of the settlements for a like purpose. The Swamp Pheasant or Cuckoo, as it is usually called (*Centropus phasianus*) is very numerous, and may be always found frequenting the extensive grass-beds throughout the Colony. These birds prey on mice and small animals, holding them with their feet, and tearing them to pieces if they are too large. I once had a pair of *Centropus* in confinement, and although scarcely nine months old, they readily killed mice or young rats when let go in their cage. They eat raw meat, grasshoppers (*Locusta*), lizards, frogs or bread readily."

THE BIRDS OF AUSTRALIA.

The movements and subspecies of this genus are not well known. The western form is differentiated from the eastern by size, but there seems to be little variation of geographic significance in colour. The species has been commonly recorded from the islands to the North of Australia, but no series have been collected for comparison with southern birds. The wing-formation suggests power of long flight so that it is possible the northern birds do make migratory movements of some distance, but these would probably be limited to certain lines so that the eastern and western races would never meet, however far the latter moved, though I do not suggest that they migrate beyond New Guinea. Facts are, however, scarce in this connection, the suggestion that they were migratory being sufficient for unfounded statements as to their migrations, though the hearing of the note seems the most noticeable item in the "records." An eastern and western form are admitted.

GENUS—POLOPHILUS.

POLOPHILUS Leach, Zool. Miscell., Vol. I., p. 115, 1814 . . Type *P. phasianinus*.

LARGEST Centropine birds with short strong bills, long rounded wings, very long tail and medium legs and feet, inner hind toe with long straight claw.

The bill is short, strong, decurved, rather deep, laterally compressed: the lower mandible is rather shallow, the rami divergent, gonys short, interramal space feathered. The nostrils appear as aperculate linear slits placed low down at base of culmen.

The wing is long and rounded, the fourth, fifth and sixth primaries subequal and longest, the third shorter than the seventh but longer than the eighth, the second equal to the ninth, the first shorter than the secondaries which are about the length of the tenth, the first is only about half the length of the fourth.

The tail is very long, about half as long again as the wing, roundly wedge-shaped, the outer feather about two-thirds the length of the middle six which are about equal.

The legs are long and strong, with long prominent scutes on the front of the tarsus and obsolete scutes behind. The toes are short, the inner hind toe bearing a long straight claw, longer than the toe itself, the other claws curved and normal of medium length. The outer fore toe is longest, the outer hind toe longer than inner fore toe, inner hind toe shortest.

This genus has been included in *Centropus*, but it seems best to distinguish the differences by the usage of the above name, as the endemic Australian bird is the largest of the family and has a comparatively short bill, very long tail, different wing formula and different toe proportions. As the forms are all generalised it is possible that anatomical comparison would show features of interest.

POLOPHILUS PHASIANINUS.

COUCAL.

(PLATE 362.)

CUCULUS PHASIANINUS Latham, Index Ornith. Suppl., p. XXX. 1801; New South Wales.
Cuculus phasianinus Latham, Index Ornith. Suppl., p. XXX., 1801.

Polophilus phasianus Leach, Zool. Miscell., Vol. I., p. 116, 1814; Stephens in Shaw's Gen. Zool., Vol. IX., p. 48, pl. 11, 1815.

Polophilus variegatus Leach, Zool. Miscell., Vol. I., p. 116, 1814: New South Wales; Stephens in Shaw's Gen. Zool., Vol. IX., p. 48, pl. 10, 1815.

Polophilus gigas Stephens, in Shaw's Gen. Zool., Vol. IX., p. 45, 1815: New South Wales.

Corydonix giganteus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XXXIV., p. 295, 1818: New South Wales.

Corydonix phasianus Vieillot, *ib.*, p. 295.

Corydonix variegatus Vieillot, *ib.*, p. 298.

Centropus variegatus Stephens in Shaw's Gen. Zool., Vol. XIV., p. 214, 1826.

Centropus gigas, Stephens, *ib.*

*Centropus phasianus** Stephens, *ib.*; Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 306, 1827; Gould, Birds Austr., pt. xxix. (Vol. IV., pl. 92), 1st Dec., 1847; *id.*, Handb. Birds Austr., Vol. I., p. 634, 1865; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 601 (N.Q.); Forbes, *ib.*, 1878, p. 125; Ramsay, Proc. Linn. Soc. (N.S.W.), Vol. II., p. 192, 1878; Sharpe, Rep. Zool. 'Alert' 1884, p. 25 (N.Q.); Ramsay, Tab. List Austr. Birds, p. 15, 1888; Shelley, Cat. Birds Brit. Mus., Vol. XIX., p. 340, 1891; Hall, Key Birds Austr., p. 60, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. II., p. 590, 1901; Hall, Emu, Vol. I., p. 112, 1902 (N.W.A.); Le Souëf, *ib.*, Vol. II., p. 152, 1903 (N.T.); Berney, *ib.*, p. 211 (N.Q.); Carter, *ib.*, Vol. III., p. 96, 1903 (M.W.A.); Berney, *ib.*, Vol. IV., p. 46, 1904 (N.Q.); Hartert, Nov. Zool., Vol. XII., p. 219, 1905 (N.T.); Berney, Emu, Vol. VI., p. 45, 1906 (N.Q.); Mathews, Handl. Birds Austral., p. 59, 1908; Ingram, Ibis, 1908, p. 467 (N.Q.); Whitlock, Emu, Vol. VIII., p. 191, 1909 (W.A.); Mathews, *ib.*, Vol. IX., p. 8, 1909 (N.W.A.); *id.*, *ib.*, Vol. X., p. 110, 1910 (N.W.A.); Broadbent, *ib.*, p. 240 (N.Q.); G. F. Hill, *ib.*, p. 272, 1911 (N.W.A.); Barnard, *ib.*, Vol. XI., p. 25, 1911 (N.Q.); North, Austr. Mus. Spec. Cat. No. 1., Vol. III., p. 36, 1911; G. F. Hill, Emu, Vol. XII., p. 256, 1913 (N.T.); Barnard *ib.*, Vol. XIV., p. 43, 1914 (N.T.); H. L. White, *ib.*, Vol. XVI., p. 221, 1917 (N.T.).

* Recte phasianinus.



H Goodchua. del

Witherby & Co

$\frac{1}{2}$
POLOPHILUS PHASIANINUS.
(COULAL).

COUCAL.

Centropus macrourus Gould, Birds Austr., pt. xxix. (text to pl. 92, Vol. IV.), 1847 : Port Essington, Northern Territory ; *id.*, Handb. Birds Austr., Vol. I., p. 636, 1865 ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 57, 1875 (N.Q.)

Centropus melanurus Gould, Birds Austr., pt. xxix. (text to pl. 92, Vol. IV.), 1847 : Derby, North-West Australia ; *id.*, Handb. Birds Austr., Vol. I., p. 636, 1865 ; Castelnau and Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 383, 1878 (N.Q.) ; Ramsay, *ib.*, Ser. 2, Vol. II., p. 170, 1887 (N.W.A.).

Polophilus melanurus Cabanis and Heine, Mus. Heine, Vol. IV., p. 121, 1864.

Polophilus macrurus Cabanis and Heine, *ib.*, note.

Centropus phasianus (subsp. a) *macrourus* Ramsay, Proc. Linn. Soc., N.S.W., Vol. II., p. 192, 1878.

Centropus phasianus (subsp. b) *melanurus* Ramsay, *ib.*

Centropus phasianinus phasianinus Mathews, Nov. Zool., Vol. XVIII., p. 297, 1912.

Centropus phasianinus macrourus Mathews, *ib.*

Centropus phasianinus melanurus Mathews, *ib.*

Polophilus phasianinus phasianinus Mathews, List Birds Austr., p. 159, 1913.

Polophilus phasianinus melanurus Mathews, *ib.*, p. 160.

Polophilus phasianinus macrourus Mathews, *ib.*, p. 160.

Polophilus phasianinus keatsi, Ashby, South Austr. Ornith., Vol. II., p. 72, 1915 : Port Keats, Northern Territory.

Polophilus phasianinus yorki Mathews, Austral Av. Rec., Vol. III., p. 58, Apl. 7, 1916 : Cape York, Queensland.

DISTRIBUTION. New South Wales : Queensland : Northern Territory : North-west Australia and mid-West Australia.

Adult female. Entire head, sides of face, throat, neck all round, breast, abdomen, and sides of body dull black in general appearance with conspicuously glossy black shafts which reach to the tips of the feathers, base of feathers sooty-brown, the webs, which are more or less disintegrated in structure, are glittering bottle-green ; mantle and scapulars greenish black irregularly banded with dark chestnut, and, more narrowly, with buff, the shafts partly black and partly white ; lesser upper wing-coverts buff, irregularly marked with brown, ochreous-brown or chestnut brown, median and greater series similar, but the markings coarser and more pronounced ; flight-quills cinnamon rufous with mottled brown bars on the inner webs which are paler and narrower towards the base, broader and more intense on the terminal portion, and are more or less associated with buffy-white on the outer primaries, the dark pattern is increased in extent on the inner webs of the inner secondaries and the rufous-chestnut and buffy-white marking reduced to narrow bars ; the outer webs of the primary-quills marked with buff and dark brown which assume the shape of bars on the secondary-quills—all the quills fringed with white or buffy-white at the tips and the shafts rufous, becoming darker at the tips ; back and upper tail-coverts dusky-brown with narrow mottled bars of buffy-white ; tail greenish-brown with white, or buffy-white mottlings which assume the form of bars and broad margins at the tips of the feathers ; thighs and under tail-coverts black profusely marked with buff ; marginal under wing-coverts similar to the lesser upper wing-coverts, inner under wing-coverts and under-surface of flight-quills, rufous marked with dark brown and more or less with whitish ; lower aspect of tail blackish marked and tipped with buffy-white. Eyes red ; bill black : feet and tarsus leaden blue. Total length 710 mm. ; culmen 37, wing 275, tail 420, tarsus 48. Figured. Collected at Parry's Creek, North-west Australia, on the 7th of November, 1908.

Adult male. Similar, but smaller.

THE BIRDS OF AUSTRALIA.

Adult female. Crown of head, sides of face, hind-neck, and mantle rufous chestnut, becoming darker on the last, where the feathers have wavy bars of blackish-brown, the shafts of the feathers are white and stand out in bold relief; the short scapulars and inner lesser upper wing-coverts darker chestnut, and the dark pattern much coarser on the long scapulars and inner median series, there are also white cross markings—each of these patterns are much more enlarged on the innermost secondaries; outer lesser upper wing-coverts buffy-white, or straw-white with dark brown markings and white shaft-lines, the pattern similar, but much coarser on the bastard-wing, and primary-coverts; flight-quills rufous with dark brown mottled bars on the inner webs, which are much broader towards the tips, the outer webs blotched with buffy-white and irregularly marked with dark brown; back and short upper tail-coverts sooty-brown minutely marked with buffy-white which is more conspicuous on the latter, the long upper-tail-coverts much more coarsely mottled with chestnut, buffy-white, and greenish-brown which assume the shape of wavy bars; tail-feathers blackish-brown with a greenish tinge tipped with white and irregularly barred or marked with white, or buff-white, and smoke-brown—the markings most profuse on the middle feathers; chin and throat straw-colour, becoming buff on the fore-neck and upper breast, minutely spotted or barred with brown on the last; lower breast, abdomen, sides of the body and thighs sooty-black, irregularly marked with buffy-white—more profusely on the abdomen and thighs and more sparsely on the under tail-coverts; axillaries tinged with dark rufous; under wing-coverts dark rufous finely marked with brown and whitish spear-head shaft-lines; under-surface of flight-quills pale rufous, barred with brown and marked with white on the outer web of the outer primary-quill; lower aspect of tail glossy bluish-black, more or less mottled, and tipped with cream-white. Eyes dark-brown; bill light brown; tarsus bluish-grey. Total length 710; culmen 37, wing 276, tail 390, tarsus 48. Figured. Collected at King River, North-west Australia on the 5th of July, 1911.

Adult male. Similar, but smaller.

The *Immature* of each form assume the adult plumage more or less from the nest.

Nest. Placed in the centre of a tussock of broad flag-leaved grass and is built with the flags and stems of the tussock. These are interwoven into the sides and roof of a rough nest, which is lined on the bottom with gum-leaves. There is a little pathway built of gum and wattle-leaves, from the mouth of the nest sloping down to within six inches of the ground. Dimension 14 inches by 14 high outside; 7 inches by 9 long inside.

Eggs. Clutch three to five. White. 35 to 38 mm. by 27 to 30.

Breeding-season. November to February, but eggs have been taken at different months.

WHEN Latham first saw the painting of this fine species he named it *Cuculus phasianinus*, the Pheasant Cuckoo, probably from the note attached to the Watling painting. "One half the natural size. Native name *Tem-minck*. The New South Wales Pheasant. The only one seen as yet."

Later several specimens must have reached England, as Leach, in the *Zool. Miscellany*, created a genus *Polophilus*, probably unaware of Illiger's genus *Centropus*, while a couple of years later Vieillot proposed *Corydonyx* for the same group. As, however, Leach was dealing with Australian birds I use his name for the Australian species. He named as distinct a colour variation, and this was recognised by Vigors and Horsfield, who give no details of the habits of their species.

Gould's account is somewhat meagre but of interest. "The *Centropus* inhabiting New South Wales differs from that found at Port Essington in having

COUCAL.

a much shorter and more arched bill, and in being somewhat smaller in size ; specimens from the western coast differ in being smaller than the bird of New South Wales, in having a more attenuated bill and a more uniform colouring of the tail. The greater part of the coastline of New South Wales, the eastern, northern, and north-western portions of Australia generally are tenanted by *Centropus*, but only in such situations as are favourable to their habits, namely, swampy places among the brushes abounding with tall grasses and dense herbage, among which they run with facility, and when necessity prompts, fly to the lower branches of the trees, from which they ascend in a succession of leaps from branch to branch until they nearly reach the top, and then they fly off to a neighbouring tree. The most westerly part of New South Wales in which I have heard of their existence is Illawarra, where they are rare, and whence to Moreton Bay they gradually increase in numbers. . . . By dissection I learn that the males are always smaller than the females ; it also appears that when fully adult both sexes are alike in plumage, and have the bill, head, neck and abdomen black, whereas the young has the bill horn-colour, and the same parts which are black in the adult, of a deep brown with a tawny stripe down the centre of each feather."

Broadbent (*Emu*, Vol. X., p. 240, 1910) wrote : " Coucal. Murray River. On 17th January I found a nest of this bird built on the ground in long grass. The nest is about 1 foot in diameter by 11 inches high, composed of small branches of bloodwood (*Eucalyptus*) twisted together and lined with grass, with entrance on top. The nest contained three young, covered with long down, and one egg, white in colour. Common on all the east coast of Queensland on grassy flats. At Cardwell common at all times."

Mr. J. P. Rogers sent me a long description of a nest found at Parry's Creek, North-west Australia. " Nest contains four eggs. Feb. 1, 1909. The nest is placed in centre of a tussock of broad flag-leaved grass and is built with the flags and stems of the tussock. These are interwoven into the sides and roof of a rough nest which is lined on the bottom with gum-leaves. There is a little pathway built of gum and wattle-leaves from the mouth of the nest sloping down to within six inches of the ground : length of path eighteen inches ; the leaves on this path and lining the nest were renewed from time to time as soon as they showed brown green leaves were placed on top of them. Feb. 10, 1909. New leaves on path to-day. For the first time I saw the bird on the nest and the tail was pushed right over the bird's head by the top of the nest : from the appearance of the bird I should say it backed into the nest. Feb. 12, 1909. Eggs gone to-day ; there were some egg-shells in and near the nest, apparently a lizard's work. Dimension of the nest : outside 14 × 14 × 14 in. high ; inside 7 × 7 × 9 in. high ; bottom of nest outside was 14 inches from ground."

THE BIRDS OF AUSTRALIA.

G. F. Hill (*Emu*, Vol. XII., p. 256, 1913) wrote : " A common species in the coarse grass near the river and creeks (at Borroloola, Northern Territory). Two sets of eggs, each containing three, were taken on 29th December and 23rd February, and a set of four eggs on 25th January. All three were open nests, built of leafy eucalyptus twigs, lined with detached eucalyptus leaves, and situated in large tussocks of grass, about 18 inches from the ground. Their food consists of grass seeds and insects (principally *Coleoptera*). Several specimens examined were free from external parasites."

Of the Port Essington bird Gould prints a note : " Mr. Gregory informs me that 'this bird is almost invariably found in thickets or canebrakes near water, and appears to live principally upon seeds and insects ; but one was observed devouring a Cockatoo that had been recently shot and fallen in a jungle. In flight it somewhat resembles the Common Hawk, but with an irregular and uncertain movement ; it runs over the ground with great speed, and then resembles a hen Pheasant ; in the trees their actions are much like those of Jays and Magpies. The eye has a rich golden tint, and is remarkably keen and hawk-like. The body is slender, and by no means fleshy. We observed it generally in small companies and sometimes only in pairs.' "

Mr. Tom Carter has told me : " This peculiar bird used to occur in the reed-beds round the Lake at Minilya River, but when the country was stocked with cattle, which drank there, they disappeared from that locality, which was probably their southern limit. They are not uncommon in thick reeds about the Ashburton River. They are known in the mid-west as Native Pheasants."

Whitlock recorded (*Emu*, Vol. VIII., p. 191, 1909) : " A few pairs on the Coogan and some of its larger tributaries. Also observed on the Talga River, and again on the de Grey. I was surprised to hear the remarkable notes issuing from a clump of mangroves in the early morning, at Condon. It could hardly have been breeding there, I think."

I printed Rogers' notes from Parry's Creek, in North-west Australia in the *Emu*, Vol. IX., p. 8, 1909 : " Numerous along the creek. I heard the call for the first time on 10th September, which was the first hot season day we had had. It was only the first few notes of the call, and uttered half an hour after sundown. Saw one on an open piece of ground. When the bird heard me it lay flat on the ground and did not move till I stopped and looked at it. It then flew into a tree about 30 yards away. They call till nine o'clock in the evening." He later reported them as numerous on Melville Island, adding : " The alarm call is a harsh scolding note ; they hop right to the top of the trees where they seem to be actually lying on the topmost leaves."

Berney's notes (*Emu*, Vol. II., p. 211, 1903) read : " Coucal. " *Coop coop coop coop coop coop coop coop coop*," with a pause after the first

COUCAL.

“coop” and the balance rattled off. Who, hearing in the early morning this curious call for the first time, has not wondered from what bird it could possibly come? I did, and put it down to some sort of Heron, for the sound came from the creek. But a few days later I found I had made a mistake, and so did the Coucal, which enabled me to make the following observations: Feathers of the neck lanceolate, stiff, harsh, and spiny; tail that is much too long for its body, and over which it appears to exercise very little control; an exaggerated lark-like spur on one of its hind toes, a pair of very keen hawk-like eyes, a deep keeled breast-bone and thick, meaty thighs, and a strong, capacious stomach, which was crammed with grasshoppers; it was an immature specimen I had secured, immature to the extent that it had not yet attained to the black plumage state. What a strange bird this is. I have only one year’s experience of *C. phasianus*; this was at Homestead, where I believe it to be a migratory bird, arriving there in the middle of September, and after spending the summer, leaving the district at the end of March or early in April. The only thing against this idea is that I shot one, the one just mentioned, on the 30th June, but of course it is possible odd birds remain through the winter; but I saw or heard no others. Only to be found along the timbered creeks where the undergrowth is tall and rank. Their cry in the early morning, their favourite time, may be heard at a distance of two or three miles.”

He continued (*Emu*, Vol. IV., p. 46, 1904): “From Homestead Mr. Smedley reported on 18th October, 1903, that Coucals had not so far shown up. In the autumn of the following year he wrote that they had all left by 18th May. Personally, I have never come across it on the upper parts of the Flinders, and I do not think it ever extends very far from the coast. Homestead is 128 miles east [west] of Townsville.” Later (*Emu*, Vol. VI., p. 45, 1906), he added: “This is one of the birds that the edge of the basalt seems to block. I know of two instances of its being seen at the heads of creeks heading from the ranges, but it never follows them down to the river.”

This species presents dichromatism in a peculiar manner, and by means of subspecific differentiation, this can be more easily studied. A recent ornithologist meeting with dichromatism in another group became bewildered, and was fain to ascribe all variation to this cause, confusing geographic with individual variation and obscuring age variation by means of “dichromatics.” Thus Gould concluding that the “black” form was adult and the “striped” form the immature plumage from the specimens from New South Wales, separated as geographic species the birds from the North and the North-west.

In the *Catalogue of the Birds in the British Museum*, Vol. XIX., p. 340, 1891, Shelley ignored these species and described the “black” bird as “Adult

THE BIRDS OF AUSTRALIA.

male in breeding plumage," and the "striped" bird as "Adult male in non-breeding plumage," giving no reasons nor other details of plumages.

In my "Reference List" I revived Gould's species with subspecific rank, as I found that the differences mentioned were more or less constant according to geography.

I have carefully studied my series again and find that neither of the above theories hold good, as though the striped birds may be found moulting into black plumage, young birds not out of the nest also carry black plumage, so that dichromatism is the only explanation. However, when geography is included in the sphere of study, some interesting features present themselves; thus in some places the black are in the majority, in others in the minority, so that here we see age variation manifested in geographical races, and consequently I would conclude that the latter should still be considered and not discarded.

Mr. Edwin Ashby wrote (*South Australian Ornithology*, Vol. II., p. 72, 1915): "In comparing a skin collected by Mr. C. E. May at Port Keats in 1906, with the Adelaide Museum specimens, I find that it differs from the Northern Coucal, *Polophilus phasianinus macrourus* Gould, in that the whole of the plumage is black with the exception of the wings, which are normal. In comparing the specimen which is under review, which is a male, with one of *P. p. melanurus* from North-western Australia, I find that it differs in that the barring of the tail is almost absent, there are no white tips to the tail-feathers, the under-tail coverts are quite black, and not speckled as in the North-western specimen. We must either extend the range of that species as far as Port Keats in the Northern Territory, or designate this variety under the name of *keatsi*."

Here we have individual (which nevertheless might be characteristic of a geographic race) variation accepted as if it were geographical. The latter can only be determined by comparison of series, not single specimens of birds. It should be noted here that independently Stresemann concluded that the Centropodine forms of the Moluccas showed dichromatism and that the diverse coloration was not due to age, sex or individual variation alone.

As regards size it must be remembered that the males are smaller than the females, and consequently the sexes must be carefully distinguished before comparisons are made. When this is done the general features indicated by Gould are subspecifically constant, the typical New South Wales form being small, with comparatively small tail with noticeable light bars. These of course will bear the name *Polophilus phasianinus phasianinus* (Latham), and the other names given are synonyms. In the *Catalogue of the Birds in the British Museum*, Vol. XIX., p. 340, 1891, *Polophilus leucogaster* Leach was included in the synonymy, and it has been since so recorded by myself. No white-bellied specimen being available, I looked into the matter, with the result

COUCAL.

that I found the type locality wrong, "Australasia" being given by Leach, whereas it was an African bird. To my astonishment I then found that from examination of the type Shelley had so concluded, and on p. 358 used the name *Centropus leucogaster* for the West African species, but had neglected to remove it from the synonymy of the Australian bird.

From the typical locality the black and striped forms appear to be equal in numbers, and the young are also dichromatic, but the black appear to be in the minority.

A series from North Queensland, Cairns to Cape York, also show black and striped forms in the same proportions, but these are larger birds with longer tails, and as they are geographically isolated form a subspecies which I have named

Polophilus phasianinus yorki. Type from Cape York.

As far as can be judged geographically Ashby's form *keatsi* would be identical with Gould's *macrourus*: his comparison reads "differs . . . in that the whole of the plumage is black, with the exception of the wings, which are normal," simply showing it to be the black form. Therefore from the Northern Territory I at present recognise one subspecies

Polophilus phasianinus macrourus Gould, and cite *keatsi* Ashby as synonymous.

A good series from Melville Island suggest that the black form will later be the only one found there, as black birds are in a majority of five to two, and some of the full-grown striped specimens appear to be moulting into the black plumage. These have the large tail of the preceding, but are comparatively smaller, while the striped form is darker than the next subspecies. I name these

Polophilus phasianinus melvillensis subsp. n.

The type is a female collected on Melville Island, November 3rd, 1911.

The North-western birds will be called

Polophilus phasianinus melanurus (Gould).

These show the reverse, the striped form predominating, three-fourths of the series being in this state. Moreover, these are paler than the preceding. It may be noted that adults of the striped forms have pale bills, while the black form has a black bill.

It is possible that other subspecies may later be recognised, as the birds appear to be sedentary and local.

I have just noted that *Centropus* Illiger 1811 is later than *Centropodus* Latreille 1802-4, and it seems these are the same combination. At any rate *Eurostopus* and *Eurostopodus* are the same, Gould writing the latter and the former was proposed as the correct formation, Hartert using *Eurostopus* in the *Catalogue of the Birds in the British Museum*, Vol. XVI., p. 607, 1892.

ORDER MENURIFORMES.

THIS is the only order peculiar to Australia, and two species, which I separate generically, are peculiar to South-east Australia. With a large literature it is still somewhat a mystery bird, being peculiar in so many respects.

Latham ranked it as a Gallinaceous form, while Vieillot placed it with his Birds of Paradise. Such extraordinary positions incited interest, but while the authors mentioned thought it worthy of generic distinction Wagler classed it, against all nomenclatural rules, past and present, in the genus *Megapodius*, a genus proposed more than twenty years later than *Menura*. Later from anatomical features it was classed even among the "Passerine" birds, a position it has held until recently, when it was given ordinal rank though placed next to the Passeriformes. It seems possible that this association is incorrect, but no anatomist in recent years has dealt with this bird, and the early workers had little material to deal with.

To recapitulate briefly, it was placed among the Passeriform birds on account of anatomical features which were undoubtedly over-valued, and these have never since been correctly estimated. When Eyton concluded that its internal structure showed affinity with *Pteroptochus* no attempt was made to ascertain the reason of the resemblances, so the matter was left in abeyance. Huxley included it in his group equivalent to the Passeriformes of to-day, but he contrasted this form with all the rest indicating at once its abnormal nature. Later Newton associated with it, as agreeing in some of its peculiarities, the genus *Atrichia* and these were accepted as being closely allied and still opposed to the remainder of the Passeriform birds, though included in the order.

Sharpe took the correct course in separating these and determining the *Menuræ* as of ordinal rank, while removing *Atrichia* to the end of the Passeriformes; but he intended *Atrichia* to be the most archaic, and hence should have been next to *Menuræ*, which error he at once corrected.

I am convinced of the propriety of separating the Lyre-Birds as a distinct order, and have left them next to the Passeriformes, but am also certain that this is not their correct place. It is interesting to give Sharpe's diagnosis of the order.

"Nestling thickly covered with down. Furcula complete; sternum

MENURIFORMES.

with a slight indentation near the outer edge of posterior margin; plantar tarsi strongly scutellated; tail-feathers greatly produced, and mostly devoid of hooklets; *tensor patagii brevis* muscle Picarian; intrinsic muscles fastened to the ends of the semi-rings (Acromyotine); plantar tendons free."

It is generally admitted that many of the peculiar features imply degeneracy from the view point of the Passeres, but I suggest that there is no relationship with Passerine forms, and that the resemblances seen are more due to convergence than indicative of real alliance. Superficially, whatever the internal features suggest, no alliance could be gauged between *Atrichia* and *Menura*, and still less between the latter and *Pteroptochus*. The latter seems a true degenerate Passerine form, as does *Atrichia*, while no systematist from superficial characters would class *Menura* as such. Recent investigations have shown that great stress can be laid upon superficial features, if these be thoroughly studied, and that they assist in the interpretation of anatomical characters. Future considerations of these birds must give full value to each and a better alliance will thereby be propounded, the present one being undoubtedly unsatisfactory.

GENUS—M E N U R A.

MENURA Latham, Suppl. Index Ornith., p. lxi.,
1801 Type *M. novæhollandiæ*.

Also spelt—

Mænura Dumont, Dict. Sci. Nat. (Levrault), Vol. XXX., p. 50, 1824.

Parkinsonius Bechstein, Kurze Uebers Vogel., p. 134,
1811 Type *M. novæhollandiæ*.

LARGE birds with long bills, rounded wings, peculiar tails and strong legs and feet.

The bill is long, narrow and flattened, with the culmen very strongly keeled, the sides membranous towards base. The nostrils are long narrow pervious slits placed anteriorly in a groove, which extends about two-thirds the length of the bill: the tip slightly decurved, the base of the bill hidden by projecting bristly feathers. The lower mandible very flattened, the rami straight, the interramal space feathered.

Wings much rounded, the first primary about half the length of the fourth, which is longer than second and third, but subequal with the remaining primaries and not exceeding the longest secondaries.

The tail consists of sixteen feathers, which show peculiar development in many ways. The plate here given will show these much better than a long description, but it may be pointed out that the peculiar notched appearance of the inner-webs of the outer tail-feathers is due to lack of barbules on the barbs, which are present, but at first sight appear absent.

The legs are very long and strong, strongly scutellate with six large scutes in front and behind. The toes very long and subequal, the hind toe shorter, but claw much longer, the claws long and straight.



H. Grönvold, del.

Witherby & Co

$\frac{1}{5}$

MENURA VICTORIÆ.
(VICTORIAN LYRE-BIRD).

Order MENURIFORMES.

Family MENURIDÆ.

No. 416.

MENURA NOVÆHOLLANDIÆ.

LYRE-BIRD.

(PLATES 363-4.)*

MENURA N(OVÆ)-HOLLANDIÆ Latham, Suppl. Index Ornith., p. lxi., 1801: New South Wales.

Menura n(ovæ)-hollandiæ Latham, Suppl. Index Ornith., p. lxi., 1801; Mathews, Nov. Zool., Vol. XVIII., p. 17, 1911 (June); *id.*, List Birds Austr., p. 160, 1913.

Superb Menura Latham, Gen. Synops. Birds Suppl., II., p. 271*, pl. cxxxvi.,* 1801.

Menura superba Davies, Trans. Linn. Soc. (Lond.), Vol. VI., p. 207, 1802: New South Wales; Gould, Birds Austr., pt. III. (Vol. III., pl. 14), 1841; *id.*, Handb. Birds Austr., Vol. I., p. 298, 1865; Ramsey, Proc. Linn. Soc. N.S.W., Vol. I., p. 182, 1877; *id.*, Tab. List Austr. Birds, p. 7, 1888; Sharpe, Cat. Birds Brit. Mus., Vol. XIII., p. 661; Hall, Key Birds Austr., p. 52, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 507, 1901; Le Souëf, Emu, Vol. VI., p. 68, pl. IX., 1906 (N.S.W.); Ashby, *ib.*, Vol. VII., p. 94, 1907 (N.S.W.); Mathews, Handl. Birds Austral., p. 59, 1908.

Paradisea parkinsoniana Shaw and Nodder, Nat. Miscell., Vol. XIV., pl. 577, June 1, 1803: New South Wales.

Parkinsonius mirabilis Bechstein, Kurze Uebers Vogel., p. 134, 1811: New South Wales.

Menura vulgaris Fleming, Philos. Zool., Vol. II., p. 241, July, 1822: New South Wales.

Mænura lyrata Dumont, Dict. Sci. Nat. (Levrault), Vol. XXX., p. 50, May 29, 1824: New South Wales.

Mænura magnifica Lesson, Ann. Sci. Nat., Paris, Vol. VI., p. 244, 1825: New South Wales.

Megapodius menura Wagler, Syst. Avium Megapodius, sp. 1, p. 207, 1827: New South Wales.

Mænura lyra "Shaw" Lesson, Traité d'Ornith., p. 478, March 1, 1831: New South Wales.

Menura paradisea Swainson, Classif. Birds, Vol. II., p. 35, 1837: New South Wales.

Menura victoriæ Gould, Proc. Zool. Soc. (Lond.), 1862, p. 23: *Nom. nud.*; *id.*, Handb. Birds Austr., Vol. I., p. 302, 1865: Port Philip, Victoria; Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 182, 1877; *id.*, Tab. List Austr. Birds, p. 7, 1888; Sharpe, Cat. Birds

* Plates lettered *Menura victoriæ* and Tails of *Menuridæ*.

THE BIRDS OF AUSTRALIA.

Brit. Mus., Vol. XIII., p. 662; Hall, Key Birds Austr., p. 53, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 510, 1901; Kitson, Emu, Vol. V., 1905, pp. 57-67, pls. V.-X.; Mathews, Handl. Birds Austral., p. 59, 1908; Cook, Emu, Vol. VIII., p. 220, 1909; S. A. White, *ib.*, Vol. XIV., p. 139, 1915; Stone, *ib.*, Vol. XVI., p. 44, 1916; Cook, *ib.*, p. 101.

Menura novæhollandiæ novæhollandiæ Mathews, Nov. Zool., Vol. XVIII., p. 298, 1912; *id.*, List Birds Austr., p. 160, 1913.

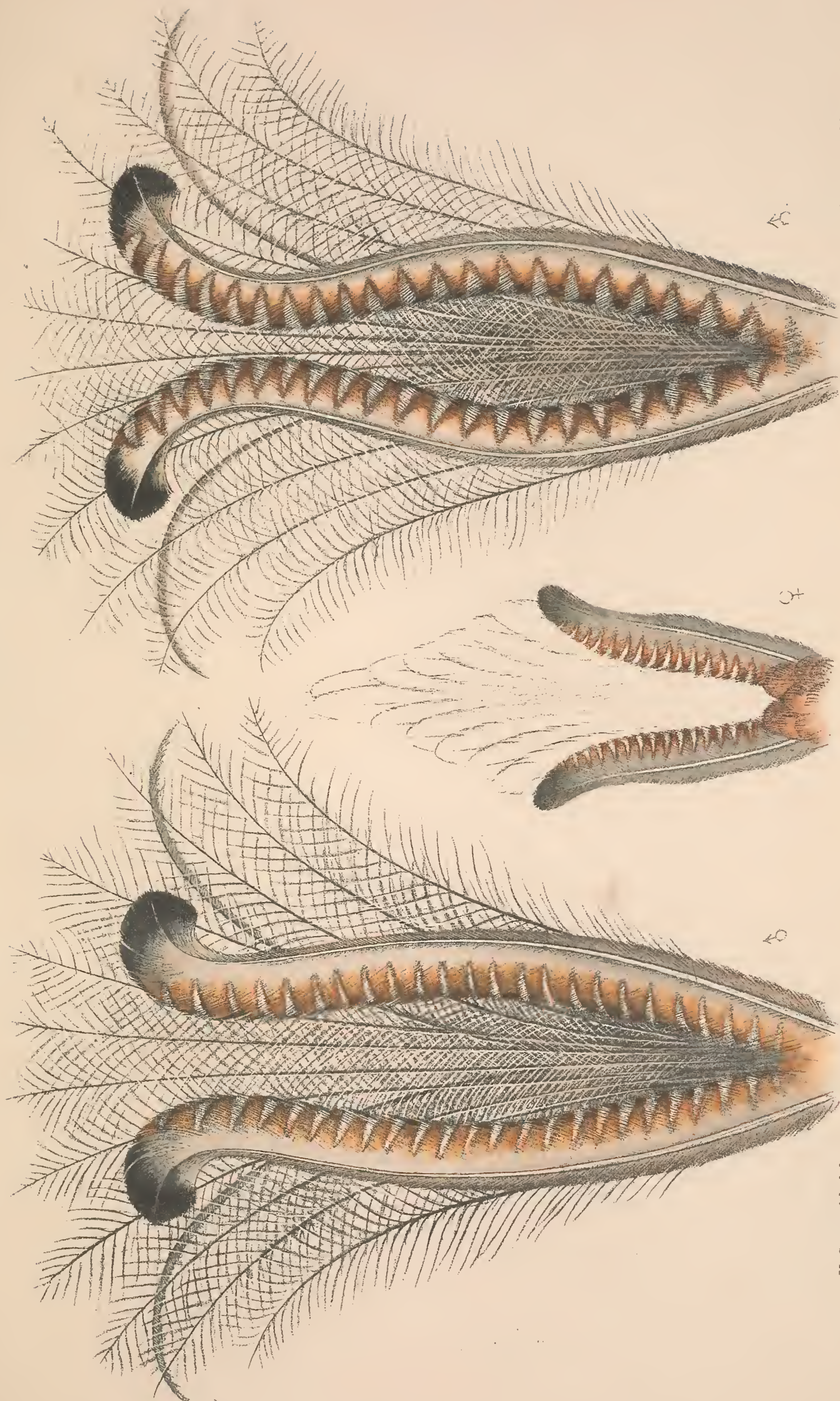
Menura novæhollandiæ victoriæ Mathews, Nov. Zool., Vol. XVIII., p. 298, 1912; *id.*, List Birds Austr., p. 160, 1913.

Menura novæhollandiæ intermedea Mathews, Austral Avian Rec., Vol. III., p. 58, April 7, 1916: Southern New South Wales.

DISTRIBUTION. New South Wales, as far north as the Clarence River. Victoria.

Adult male. Head, hind-neck, entire back, and upper wing-coverts dusky dark brown, somewhat paler on the rump, and tinged with grey on the hind-neck; bastard-wing, primary-coverts, and outer-webs of primary-quills dark rufous-brown; major upper wing-coverts and all the inner-webs of the flight-quills seal-brown; upper tail-coverts greyish olive-brown, the long ones rust-brown; general aspect of the tail above blackish, the barbs of the feathers long and very coarsely disintegrated except at the base and on the outer pair of feathers, the central feathers consist chiefly of horny shafts with a very narrow inner-web which increases in width towards the tips, the outer-webs are coarsely represented by short hair-like barbs—increasing in length and becoming much more conspicuous at the tips, some of the sublateral feathers are normal at the base and have the barbs much extended and hair-like in texture; the outermost pair have the webs normal, the outer ones narrow and the inner ones broad, outer-webs and tips blackish, inner-webs pale greenish-brown, tinged with rust-brown notches and edged with black, the margins more or less disintegrated and recoil, the tips curved outwards, black and assume more or less the shape of a spatule, the rust-brown notches appear to be formed by the barbs of the feathers having been denuded of the barbules; sides of face greyish-brown; throat and fore-neck chocolate-brown; breast and abdomen grey with paler margins to some of the feathers on the former; inclining to hair-brown on the thighs; under tail-coverts, sides of body, under wing-coverts and under-surface of flight-quills greyish-brown; lower aspect of tail silvery-grey inclining to white on the outermost pair of feathers which are largely notched with walnut-brown on the inner-webs and black on the spatule at the tips. Eyes, hazel; bill and feet black; bare space round the eye bluish. Total length 1,070 mm.; culmen 35, wing 287, tail 670, tarsus 114. Figured. Collected at Selby, Victoria, on the 2nd of August, 1914.

Adult female. Crown of head, sides of face and hind-neck blackish-brown, more or less tinged with grey on the last; upper wing-coverts and back paler and inclining to walnut-brown; bastard-wing, primary-coverts and outer aspect of the flight-quills pale brown with an ochreous tinge; inner-webs of the last black, outer-webs of inner greater upper wing-coverts and innermost secondaries rich walnut-brown; rump and upper tail-coverts dusky-brown, the feathers long and fluffy with very thin and weak shafts, the long upper tail-coverts rust-brown; outer-webs of tail-feathers bronze-brown, the inner-webs darker and inclining to blackish, the webs of the central pair much narrower than those of the lateral ones; chin and throat dark chestnut; remainder of the under-surface dark ash-grey including the under wing-coverts, much paler on the vent and darker on the thighs; under-surface of flight-quills pale brown; lower aspect of tail silvery-grey with rust-colour on the inner-



H. Grönvold del.

TAILS OF MENURIDÆ.

Witherby & Co

LYRE-BIRD.

webs and the apical portion of some of the feathers, the rust-colour taking the form of indentations on some of the outer feathers, the indentations are formed by the abrasion of some of the barbules on the barbs of the feathers. Eyes, hazel; feet and legs black; bare space round the eye bluish. Wing 295 mm.; tail 460. Figured. Collected in Gippsland, Victoria, in July, 1886.

Adult female. Hinder crown, nape, sides of face, hind-neck, back, upper tail-coverts, and upper wing-coverts dusky-brown, the last tinged with bronze-brown; outer aspect of the flight-quills rich walnut-brown; tail bronze-brown, some of the feathers olive towards the base; fore-head, cheeks and throat chestnut; fore-neck, breast, abdomen, sides of the body, and under wing-coverts dusky greyish-brown, paler on the lower-abdomen and more dusky on the thighs and sides of the vent; under tail-coverts hazel-brown at the tips; under-surface of flight-quills greyish-brown; lower aspect of the tail dark silvery-grey with rust-brown indentations on the inner-webs of some of the lateral feathers—the inner-webs of some of the middle feathers tinged only with the same colour. Eyes hazel; feet and legs black; bare space bluish. Wing 280 mm.; tail 480. Collected at Dawson, Victoria, in December, 1898.

Immature. Covered with long fluffy down.

Nest. A bulky structure, composed of longish sticks, lined with fine material and feathers; side entrance. Placed mostly on ground, but of late years placed as high as thirty feet or more in trees.

Eggs. Clutch one. Ground-colour light stone to deep brown, spotted and blotched with slate-grey and dull purple. 56 mm.; by 41 to 47.

Breeding-season. June to August or September.

WHEN Latham was printing his Second Supplement to his *General Synopsis of Birds* this extraordinary species came under his observation, and he immediately had a plate prepared, which is dated "Published as the Act directs, May 30, 1801," and a full description drawn up of his genus *Menura*, Superb *Menura* being given as the vernacular name. The plate and pages bearing the description are inserted into the Gallinaceous order, which had already been printed off, as the plate is lettered "Pl. cxxxvi.," the genus "LIII*" and the pages "271* and 272*," the latter signed "Mm5."

It however comes in the ordinary place in the *Supplementum*, where the species is named "*M. n. hollandiæ*," the vernacular "New Holland *Menura*" being given instead of "Superb *Menura*" as printed at the place cited.

I have given these details as simultaneously it was described by Davies as *Menura superba*, the paper being read in 1800 but not published until 1802, when also it was included in the *Naturalists' Miscellany* under the name *Paradisea parkinsoniana*.

Latham knew of five specimens having arrived in England at the time he wrote, and according to Collins the first specimen was procured on the banks of the Nepean River on the 24th January, 1798. Davies' figure is

THE BIRDS OF AUSTRALIA.

signed as drawn by himself in 1799 and this seems to be the only bird Davies described, though Latham continually quotes Davies' collection for species he proposed, and the conclusion is that Latham drew up the description and name for Davies and then introduced it into his *Index and Supplement*, which were published first. It will be noticed that the vernacular Superb Menura was used by both, but for some unknown reason Latham wrote New Holland Menura and latinised it as *M. novæhollandiæ* when preparing the *Index*. The species received half a dozen names by the earlier workers, who objected to the combinations already proposed, though the vernacular was practically unchallenged.

Gould's account of the life-history of the bird in New South Wales is here again presented, as most of the recent notes have been in connection with the southern subspecies. Thus Gould wrote: "The principal habitat of the *Menura superba* is New South Wales, and from what I could learn, its range does not extend so far to the eastward as Moreton Bay, nor have I been able to trace it to the westward of Port Philip. It appears to inhabit alike the brushes on the coast and those that clothe the sides of the mountains in the interior. In the interior the cedar brushes of the Liverpool Range and, according to Dr. Bennett, the mountains of the Tumat country are among the places of its resort. Of all the birds I have ever met with, the *Menura* is by far the most shy and difficult to procure. While among the brushes I have been surrounded by these birds, pouring forth their loud and liquid calls, for days together, without being able to get a sight of them; and it was only by the most determined perseverance that I was enabled to effect this to me desirable object, which was rendered the more difficult by their often frequenting the almost inaccessible and precipitous sides of gullies and ravines, covered with tangled masses of creepers and umbrageous trees; the cracking of a stick, the rolling down of a small stone, or any other noise, however slight, is sufficient to alarm them; and none but those who have traversed the rugged, hot and suffocating brushes can fully understand the excessive labour attendant on the pursuit of the *Menura*. Those who wish even to sight it must only advance when the bird's attention is occupied in singing, or in scratching up the leaves in search of food. To watch its actions, it is necessary to remain perfectly motionless, or it vanishes from sight as if by magic. But the *Menura* is not always so alert; for in some of the more accessible brushes through which roads have been cut, it may frequently be seen, and on horseback even closely approached, the bird apparently evincing less fear of those animals than of man when thus unaccompanied.

The Lyre-Bird is of a wandering disposition, and although it keeps to the same brush, it is constantly traversing it from one end to the other, from

LYRE-BIRD.

mountain-top to the bottom of the gullies, whose steep and rugged sides present no obstacle to its long legs and powerful muscular thighs; it is also capable of performing extraordinary leaps, and I have heard it stated that it will spring to a ledge of a rock or a branch of a tree ten feet perpendicularly from the ground. It appears to be of solitary habits, as I have never seen more than a pair together, and these only in a single instance; they were both males, and were chasing each other round and round with extreme rapidity, apparently in play, pausing every now and then to utter their loud, shrill calls; while thus employed they carried the tail horizontally, as they always do when running quickly through the brushes, this being the only position in which it could be conveniently borne. Among its many curious habits is that of forming small round hillocks, which are constantly visited during the day, and upon which the male is continually tramping, at the same time erecting and spreading out his tail in the most graceful manner, and uttering his various cries, sometimes pouring forth his natural notes, at others mocking those of other birds, and even the howling of the dingo. The early morning and the evening are the periods when it is most animated and active. It may be truly said that all the beauty of this bird lies in the plumage of his tail, the new feathers of which appear in February or March, but do not attain their full beauty and perfection until June; during this and the four succeeding months it is in its finest state; after this the feathers are gradually shed, to be resumed again at the period above stated. I am led to believe that they are all assumed simultaneously by the fact of a native having brought to my camp a specimen with a tail not more than six inches long, the feathers of which were in embryo, and all of the same length. Upon reference to my journal I find the following notes upon the subject: 'Mar. 14, Liverpool Range. Several *Menuras* killed to-day; their tails not as fine as they will be.' 'Oct. 25. I find this bird is now losing its tail-feathers; and, judging from appearances, they will be all shed in a fortnight.' "

Dr. E. Brooke Nicholls, under the title of "A Trip to the Bass Valley" in the *Victorian Naturalist*, Vol. XXVIII., p. 152, Dec. 7, 1911, has given a fine account of the vocal qualities of the Victorian form, which I reproduce: "The call-notes of the Butcher-Birds in this gully were wonderful both in number and variety. The whole valley seemed to resound with them and we heard the calls of many other birds we did not see. They followed one another in quick succession—the Harmonious Thrush, Wattle-birds, Pennant's Parakeet, Grey Magpies, and others. We were on the look-out for the Lyre-Bird, but had not seen it or heard its call. Then, in a flash, we realised we had been listening to the bird for some minutes. The rapid succession

THE BIRDS OF AUSTRALIA.

of different calls from unseen birds forced the truth upon us. We concluded the Lyre-Birds were not more than 200 yards from us, and started to locate them. Stepping, slipping, and falling quietly down hill through the dense undergrowth, we got to within thirty yards of them. Then we seated ourselves and listened to the most wonderful and beautiful series of bird notes it has been our good fortune to hear. For several minutes we sat in a spell of delight, and then, recovering, copied down on the spot the calls as they were imitated. And when we say imitated we mean more than the word conveys, for every note and sound was a perfect reproduction of the call of the bird mimicked, and as Mr. Milligan declared, was rendered with more grace and finish than it would be by the original itself.

The following is the list of calls, taken down at the time :—

1. Native Bear.
2. Young Magpie being fed.
3. Boobook Owl (deep, guttural, and a perfect imitation).
4. White-throated Thickhead.
- 5, 6 and 7. Three calls of the Harmonious Thrush—first, the single high-pitched alarm note; second, the “Choked, choked with a cherry” call; third, a second alarm call, consisting of several notes pitched in the same key.
8. Starling. “The indrawn whistle” likened by Mr. Milligan to the swish of a rocket.
9. The Satin Bower-Bird.
10. Butcher-Bird.
11. Wattle-bird.
12. Whistling Eagle.
13. Black Cockatoo.
14. Alarm notes of a flock of startled Parrots. In mimicking these notes the fluttering and winnowing sounds of the wings of the rising birds were accurately represented.
15. Pennant’s Parakeet.
16. Magpie’s alarm note.
17. Scrub-Wren.
18. *Acanthiza pusilla* (scolding note).
19. Laughing Jackass (the gurgling notes at the beginning of the laugh only).
20. *Strepera*.
21. Creaking of tree limbs moved by the wind.
- 22 and 23. Mechanical sounds. The first, repeated rapidly, sounded like “Choo, choo, choo, choo.” This we afterwards recognised as the sound

LYRE-BIRD.

made by the engines of the heavy coal-laden trains as they puffed up a sharp incline just outside the Nyora railway yard, some four and a half miles distant from this valley. The other was a soft note slowly repeated, and might have represented the sound of a broad axe at work on a log.

24. Two Magpies meeting in the air. This was a reproduction of loud notes uttered when two Magpies meet in collision in mid-air.

25. Coachwhip Bird.

Whilst listening to this wonderful performance we caught sight of one of the birds. From the rapidity with which the calls were uttered, and the different directions in which they were coming, we concluded that there were two birds engaged in a rivalry of song. The bird we had seen discovered us, and, crossing the creek, it climbed the slope we were on and came round the back of us to within ten yards. It was a female. The bird uttered not a note whilst we watched it, and all the time it was on the move the mimicry continued. We then walked forward to catch a sight of the singer, and got to within twenty yards of the male bird when it broke cover. For a moment we saw the bird, and then it disappeared, and we had heard the last of the performance. We had been listening for forty minutes, and for half an hour of that time had been within twenty-five to thirty yards of the Lyre-Bird. Examining the ground, we found it scratched and turned in all directions. No dancing-mound was to be seen, so the entertainment was gone through whilst the birds, or at least the female, was feeding. Just as we were preparing to leave the spot, a series of shrill cries attracted us, and in a few seconds the male and female Lyre-Birds dashed past into the scrub. They were the pair we had been watching and passed so near that we stretched out our hands to capture them. We searched carefully for a nest, but without success. There are one or two points of interest in connection with the behaviour of the birds and the order in which the call notes of the various birds followed one another. The female undoubtedly saw us, but apparently gave no warning or alarm note of any kind; and she took no part whatever in the vocal performance. The imitations were not always rendered in the full sequence given in the list. Whilst both birds were undisturbed it was adhered to, call following call in unbroken succession. But when the female came over to us the song was interrupted by pauses and single imitations, those of the Butcher-Bird and the rising of the Parrot-flocks being often repeated. A new series always commenced with the second note of the Harmonious Thrush. The call of the Mopoke was given only twice. Sounds that were similar and bird calls pitched in the same key, or that harmonised, always followed one another. The two mechanical sounds were always kept together, as were the cries of the Whistling Eagle and Black Cockatoo. The notes of the smaller

THE BIRDS OF AUSTRALIA.

birds, the Thornbills and Scrub-Wrens, always followed in sequence, and when these calls were uttered the whole volume of the Lyre-Bird's voice was modulated and toned down to low whispering notes."

In the *Australian Zoologist*, Vol. I., pt. 4, Oct. 8, 1917, pp. 81-82, pls. VII and VIII., appeared some good nesting notes on the typical Lyre-Bird, by John Ramsay and Albert E. Keene, which are here reproduced:—

"A Lyre-Bird was heard calling on the range at the back of Point Clare, near Gosford, New South Wales, on 26th June, 1916, so a careful search was instituted, with the result that, when least expected, the female bird was flushed from a nest containing a warm egg. The nest was a typical one of the species, placed on a flat rock at the base of a sapling, and surrounded by a wealth of ferns and scrub, on the steep slope of a dry watercourse. On again inspecting the nest on 1st July, the egg was found to be quite cold, and fears were entertained that the nest had been deserted, but a 'hiding-tent' was placed in position near the nest and left overnight. At 9.30 a.m. on the 2nd July, the egg was still cold, and there was no sign of the parent bird. About 1.30 p.m. she appeared, looking very anxious and wary. For half an hour she made a careful inspection of the tent and surroundings, even peering through the opening at the photographer, Mr. Keene, who, with cramped limbs, hardly dared to breathe for fear of scaring her away again. Satisfied at last she stepped on to the stone below and in front of the nest paused a moment, and was 'snapped.' At the click of the shutter she darted away, and after waiting half an hour in the hope of her return, the photographer left without seeing her again. On the following Sunday (9th July) the egg was examined and found to be quite cold at 9.30 a.m., and the bird was not heard approaching until 11.30 a.m. She appeared to be feeding on the way, never ceasing to scratch as she gradually approached. She was obviously less timid than on the previous occasion, but made a careful inspection of the tent, as before, putting her head within a foot or two of the entrance and peering through the narrow opening. All being still, she walked again to the stone and leaped lightly and easily on to the nest, a distance of at least three feet. Hardly pausing, she entered the nest, turned round, and settled herself on the egg. After leaving her for some little time, the photographer showed himself at the side of the tent, when she slipped out of the nest and ran off, though apparently not greatly frightened. She was heard scratching close by during the next half hour, and then, after the usual inspection, she returned to the nest, and was allowed to remain undisturbed. This procedure was maintained until the 30th July. At 9 a.m. each day the egg was found to be cold, and there

LYRE-BIRD.

were no signs of the bird, although the greatest caution was observed in approaching the nest. She would be heard scratching in the vicinity about 11 o'clock, and invariably approached by the same route, and from the back and to the right of the nest. Each day the tent was thoroughly examined, and she continued intermittently to scratch up to the moment of stepping on the stone, from whence she sprang into the nest, but once settled on the egg, she allowed the photographer to stand in front of the nest without leaving it, and took no notice of the camera shutter. On the 30th July the young bird was found hatched, but the parent was absent from 9 till nearly 11.30 a.m., after which she visited the nest at intervals of about half an hour until the observer left between 2 and 3 p.m. Although she was obviously engaged in feeding the young bird on each visit, and was in full view at a distance of a few feet, no sign of food in her bill could be detected, nor was she seen to clean the nest. On 13th August an interesting note was made. On going to the nest, the young bird, then about a fortnight old, was found standing stiffly erect, in such a manner that its body was above the level of the nest opening, and pressed against the inside of the dome-shaped roof. In this position, even a careful scrutiny would only reveal two dark stick-like legs, and anyone seeing this remarkable attitude could only conclude that it was another example of nature's protection of the helpless. On the last-mentioned date the young bird was removed from the nest and photographed, the parent being in such a state of excitement the while that she would venture within a few feet of the observer. During the whole time she kept up a running fire of calls, whistles, and peculiar throaty noises, accompanied by the young bird in a series of squeaks. The combined noises created quite a volume of sound, which increased when the young bird temporarily escaped, and had to be chased through the undergrowth. He was recaptured and replaced in the nest, and contrary to experience with many other species, quietly remained there. The tent and camera were packed up, the birds ceased calling, and five minutes later all was quiet. At no time during the period the nest was under observation was the male Lyre-Bird either seen or heard. Twelve months later (22nd July, 1917) Lyre-Birds were calling in the same locality."

Mr. A. G. Campbell has written me: "The natural habitat of this bird in South Gippsland and Gembrook Ranges is fast being despoiled. The settler with fire and axe is changing the scene from forest grandeur into one of desolation. The general effect given to one of these mountain districts by the dry skeletons of the forest and the ground not yet in good heart is very depressing, the more so when memory recalls the many

THE BIRDS OF AUSTRALIA.

fascinating life forms that once made the locality so romantic. But this is a necessary transition stage between primeval forest and productivity for man. Turning from this we may trace the valley down and find a patch of virgin forest yet unspoiled, and dipping into it may see the Lyre-Bird at home. The scrub is filled with characteristic odour of decomposing gum leaves and aromatic shrubs; musk trees, hazels, blackwoods and many other plants form a thicket of growth beneath the kindly shelter of giant eucalypts. Wire grass, sword grass and the vegetable cables of supplejack occasionally impede progress, for they are tough and spiteful. Ferns there are in plenty, and abundant scratchings in the ground about them indicate the presence of Lyre-Birds. In parts the scrub floor seems to have been energetically raked that very morning. The birds love to work on a bank where they can shoot out their scrapings downhill. Several 'faces' of earth are to be observed with fresh marks of the birds' claws upon them. The Lyre-Bird has to work hard for its living, turning over in a systematic manner vast quantities of earth in search of beetle larvæ, crustacea and molluscs upon which it mainly feeds. In return for food offered, the great trees have the soil about their base continually cultivated by this feathered forester. Away at the head of a short side creek, in a horseshoe-like earth slip, a nest is found. The position is an ideal one. The nest, set against the bank, which is dressed in small ferns, cannot be approached from the rear, while in front the sitting bird has a fine outlook in case of surprise. The nest contains one egg in July and August. The finding of eight large feathers of a male bird's tail told its own story. With the introduction of foxes, and from the fact that the female lays but one egg a season, the Lyre-Bird seems to be doomed. That one egg is sufficient under normal conditions is evidenced by the numbers of birds in the Upper Yarra and North Gippsland districts. The Lyre-Bird evidently is a king—it stands at the head of the bird inhabitants and is not preyed upon by anything. So, like other forms of life in that proud position, it has a specialised and not an indiscriminate reproduction. But with the quick spread of the fox, the bird cannot as quickly alter its habits to meet the case. In the vicinity of Mt. Cobbler, North-east Victoria, where there is much sandstone rock outcropping in the valleys, the Lyre-Bird usually selects a stony shelf or cleft in some spot commanding a good outlook, to place its nest. I observed a nest once in romantic conditions—resting upon a rocky ledge, embowered with ferns and with a small waterfall playing alongside. The habit of nesting among rocks, though rare with *M. victoriae*, is quite common with *M. superba*, chiefly because of the prevalence of rocks in the regions inhabited."

LYRE-BIRD.

Mr. Edwin Ashby has forwarded me this note: "On June 12th, 1915, at Woodford in the Blue Mountains, New South Wales, I found a Lyre-Bird's nest within half a mile of the township. It was built in the top of a grass tree (*Xanthorea*) at the head of a little gorge; the entrance of the nest was so placed that the sitting bird could see everything in the gorge, and there was a sheer drop of twenty to thirty feet from the nest down the gully. The nest was well made with roots, twigs and grass, and was finished all but the lining. The hen bird was driven off the nest on the 8th of August following and, unfortunately, my friends were unwise enough to handle the egg, which caused the bird to desert. I was over again in Sydney at the end of September, and found that a completely formed chick was in the egg ready to hatch. The egg has been mended and is in my collection, the chick and nest in the South Australian Museum. I thought the early date of the almost completion of the nest worth recording. In Victoria I have listened to the cock bird when on his 'seat' or 'scratch' imitating all the wild birds of the bush. While the home of this bird is usually where there are deep tree-fern gullies, some years ago I found the bird numerous near Bembo, New South Wales, in the Macheenally Ranges: there were no tree ferns, the country was what we should call 'open forest,' some underbush but not thick. The gentleman with whom I stayed told me that some time previously near his home at Cowra Creek in the same ranges he heard what he supposed was a 'Prospector' knapping, i.e., knocking off pieces of quartz hunting for gold: on going nearer to see who it was, he was astonished to find it was a Lyre-Bird making this sound. Some time before there had been a gold rush and hundreds of miners hunting for reef gold, so the bird in question had added the sound of knapping to its repertoire."

Mr. E. J. Christian's notes read: "This beautiful bird (*Menura victoriæ*) is only found in this State, and only in the more mountainous and impenetrable districts of the south-east. Unless steps are quickly taken to secure a reserve for this bird in one of its favourite haunts it will disappear altogether or become very rare indeed. 'Pot-hunters' or 'Cockney sportsmen,' aye, even many others, will destroy it for the sake of its peculiar tail. Foxes have wrought great havoc amongst them and slaughter a great many every year, but nature is helping them, as I will show further on. The nearest place to Melbourne in which I ever saw these birds was at Gembrook, high up in the Dandenong Ranges, forty-one miles by rail from the metropolis. Birds, however, are to be seen, I believe, near Lilydale and Nealesville, twenty-four and thirty-nine miles respectively from the city. The three places mentioned are nearly due east

THE BIRDS OF AUSTRALIA.

of Melbourne, and lie in mountains which are covered with huge gum forests and have their sides serrated with deep impenetrable gullies. It is in these places that the Lyre-Bird lives. It is often called 'Bulu bulu,' which is the native name for it. It is a very valuable bird, as it eats many insects in the thick undergrowths where other birds do not go, and it is said to benefit many crops. It has been truly called the 'Mocking Bird of Australia.' Nothing can equal it in its powers of mimicry: birds such as Laughing Jackasses, Coachwhips, and many others such as Parrots on the wing are imitated to perfection. The ring of the selector's axe, the barking of a dog, the whizzing, musical sound of the circular saw heard in the big timber country are also repeated by this marvellous bird. In short, there is hardly any noise in the bush that he cannot imitate. He has even been heard to imitate the grunting of the Koala or Native Bear. In early August 1905, six of us, members of the Bird Observers' Club, viz., Messrs. A. J. and A. G. Campbell, F. and R. Godfrey, J. M. Thomson and myself went for a week-end up to Gembrook. We left Melbourne on the Saturday evening's train and arrived at Gembrook, about 1,050 ft. up in the Dandenong Ranges at about 10 p.m. We had a four or five mile trudge in the wet, Mr. A. G. Campbell carrying a hurricane lamp. Notwithstanding the wet and treading in much water we arrived at a small house in a cleared portion, and camped there all night. It rained heavily all night, and we all thought that our 'Lyre-Bird' excursion was to be spoilt. However, about 8 a.m. next morning it stopped raining and the sun came out. We packed our lunches on our backs and struck into the thickest parts, and very soon heard the beautiful clear notes of the Lyre-Bird echoing above everything else. Numerous gullies exist, very dark and with thick undergrowth, water generally trickling along a stony bed covered with tree ferns. Each pair of Lyre-Birds seems to have their special gully. Each stump and thick place was carefully examined, and at last I found on top of a stump, about three and a half feet from the ground, a nest. In it was one egg, but it had a hole in it from which the chick had emerged. Another nest was found, but I think we were too late, as in parts of Gippsland this bird starts to build in the end of May or beginning of June. The nest is really a double nest. I found that the interior nest consisted of pieces off the trunks of tree ferns and small roots interwoven with leaves and moss. The interior was lined with feathers. The outer nest was made of thicker twigs, and these form a roof for the inner nest. On the front of the nest, which is oval in shape, a small platform of twigs is built. On top of the whole structure old fronds of ferns and other decayed matter were thrown about,

LYRE-BIRD.

making the nest very hard to see. When the hen is on the nest her tail comes right over her back and lies along parallel with her. Earlier I mentioned how nature was helping to protect this bird and how evolution was working. These birds suffer from many enemies near the ground, such as cats and foxes, as their nests are so low. In the last two or three years many nests have been found higher up in trees, so that they are getting out of reach of dogs and foxes. I have seen a photo of a nest twelve feet above the ground."

I have refrained from further quotations from Gould, Campbell and North, as such would not give any more complete information than I have put forward, but I refer my readers to these writers who have given very good accounts, and which may be read with interest.

I have not differentiated the Victorian form specifically, and here quote Gould's remarks upon the matter: "Those ornithologists who have examined specimens of the *Menuræ* from the neighbourhood of Melbourne must have noticed a great difference in the structure of their tails from this lyre-shaped organ in examples from New South Wales. Although on slender grounds, I admit, I have been induced to consider the Port Philip bird to be a distinct species; I say slender grounds, because I have not seen a sufficient number of specimens from that locality to enable me to say positively that it is really different. . . . The chief difference of the bird I have named *M. victoriae* is the diminished length of its outer tail-feathers, and their much stronger and broader markings."

In 1901 Campbell wrote: "Certainly these seem slender grounds (as Gould himself admitted) for separating the two species. But since that great naturalist's day, no ornithologist has been bold enough to say they are not distinct. However, it would be highly interesting to learn where the two species insulate or what tract of country divides the one kind of bird from the other."

I took the "bold" course in 1912, reducing the Victoria bird to the rank of a subspecies only, and in 1916 distinguished the form inhabiting Southern New South Wales as an intermediate race, having a shorter tail than the typical form, but not so pronounced as in the Victorian subspecies.

Three subspecies may be separated:

Menura novæhollandiæ novæhollandiæ Latham, North New South Wales.

Menura novæhollandiæ intermedea Mathews, Southern New South Wales.

Menura novæhollandiæ victoriae Gould, Victoria.

GENUS—HARRIWHITEA.

HARRIWHITEA Mathews, Austral Avian Record, Vol. I.,
p. 109, 1912 Type *H. alberti*.

At the place cited I recorded: "Differs from *Menura* in the different form of the tail, lacking the long curved outer rectrix."

That the two species of Lyre-Birds should be associated in the same genus was not unexpected, as they constitute an anomalous pair, but the differences are valid and certainly should be recognised by generic separation. Their tail structure indicates peculiar evolution, and consequently the differences must be emphasised and not minimised.

Whatever the correct location of the group may be, it cannot be denied that it is well defined and distinctive, and consequently the differences *inter se* must be of much greater value than similar differences observed in an ill-defined or plastic series.

It is unfortunate that the present form is practically extinct, so that anatomical investigation cannot be undertaken, as it might be that such would reveal peculiarities which might assist us appreciably in the interpretation of this order.



H. Grönvold, del.

Witherby & Co.

$\frac{1}{5}$

HARRIWHITEA ALBERTI.

(NORTHERN LYRE-BIRD).

HARRIWHITEA ALBERTI.

NORTHERN LYRE-BIRD.

(PLATE 365.)

MENURA ALBERTI Bonaparte, Consp. Gen. Av., Vol. I., p. 215, 1850 ; Richmond River, New South Wales.

Menura alberti Bonaparte, Consp. Gen. Av., Vol. I., p. 215, 1850 : Gould, Birds Austr., Suppl., pt. 1., pl. 19, 1851 ; *id.*, Proc. Zool. Soc., 1853, p. 45 ; Leycester, *ib.*, 1860, p. 113 : Ibis, 1861, p. 174 ; Bennett, Gath. Natur. in Austr., p. 185, 1860 ; Gould, Handb. Birds Austr., Vol. I., p. 307, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 182, 1877 ; *id.*, Tab. List Austr. Birds, p. 7, 1888 ; Sharpe, Cat. Birds Brit. Mus., Vol. XIII., p. 662 ; Hall, Key Birds Austr., p. 53, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 523, 1901 ; Mathews, Handl. Birds Austral., p. 59, 1908 ; *id.*, Nov. Zool., Vol. XVIII., p. 298, 1912.

Harriwhitea alberti Mathews, List Birds Austr., p. 161, 1912.

Harriwhitea alberti rufa Mathews, Austral Av. Rec., Vol. III., p. 58, April 7, 1916 ; Southern Queensland.

Harriwhitea alberti alberti Mathews, *ib.*

DISTRIBUTION. New South Wales (Richmond River District). Southern Queensland.

Adult male. Head and nape crested, the feathers fairly long, wide, and round at the tips ; base of fore-head deep rufous-brown ; crown of head dark brown ; hind-neck and sides of neck dusky-brown with a very slight tinge of grey ; entire back, scapulars, upper wing-coverts, innermost secondaries, rump, and upper tail-coverts dark chestnut-brown ; bastard-wing long, extending beyond the primary-coverts ; flight-quills golden-brown darker on the inner-webs ; primary-coverts also rather darker than the outer aspect of the quills ; tail glossy blackish-brown, the apical portion of the feathers coarsely disintegrated, the two middle feathers golden-brown with narrow webs and curved towards the tips, the outer-webs are fairly broad at the base but the remaining portion is very much narrower and coarsely disintegrated in structure. The inner-web is narrow at the base, increasing in width on the subapical portion and narrowing again at the tip, but the structure is quite normal ; the short feathers round the eye lead-grey inclining to brown on the ear-coverts and hind-face ; chin, throat, and fore-neck deep chestnut ; breast, abdomen, thighs, and sides of the body ash-grey with a wash of pale ferruginous which becomes much more intense on the flanks where it is also deeper in colour ; under tail-coverts and quill-lining greyish-brown with a ruddy tinge ; lower aspect of tail grey, somewhat darker towards the tips on the outer feathers. Eyes hazel ; bare space round eye bluish ; bill and feet black. Total length 880 mm. ; culmen

THE BIRDS OF AUSTRALIA.

32, wing 296, tail 510, tarsus 122. Figured. Collected in northern New South Wales in 1876.

Adult female. Head crested, like the male, which is dark brown like the hind-neck, the latter more or less tinged with grey; wings, scapulars, and entire back chestnut-brown; upper tail-coverts rust-brown with grey bases to the feathers which are much in evidence on the rump where the feathers are fluffy and many of them disintegrated at the tips; middle-tail feathers and outer ones at base of outer-webs similar to the back, the remainder of the outer feathers dark brown slightly disintegrated at the tips; cheeks and ear-coverts dark brown like the top of the head; chin, throat, and sides of the neck dull chestnut; breast, abdomen, and sides of the body pale ash-grey with a wash of pale ferruginous which is more intensified on the sides of the body; thighs uniform ash-grey darker towards the knee-joint; vent and under tail-coverts dusky-grey tipped with bright chestnut; under wing-coverts and quill-lining glossy greyish-brown; lower aspect of tail similar but darker and becoming ochreous towards the tips. Eyes hazel; bill and feet black; bare space bluish. Wing 255 mm.; tail 400. Figured. Collected in northern New South Wales.

Nest. "Large dome shaped structure, outwardly formed of stick and twigs, dried ferns, mosses and black hair-like rootlets, the bottom of the nest inside being lined with the downy feathers" (North). Rather like the nest of the previous species.

Eggs. Very similar to the eggs of the previous species.

Breeding-season. June and July.

THE whole life-history of this species seems to be that given by Gould, and therefore I am compelled to quote it in full. It seems that the bird is now approaching extinction, if this be not already achieved.

Gould wrote: "The first specimens that came under my notice were sent to me by the late F. Strange, who informed me that he met with the bird 'in the cedar brushes which skirt Turanga Creek, Richmond River.' Like the *M. superba*, it is of a shy disposition. I spent ten days in the midst of the cedar brushes in the hope of learning something of its nidification, but did not succeed in finding any nest with eggs; I found, however, one large domed nest made of sticks and placed in the spur of a large fig tree, which the natives assured me was that of the *Colwin*, their name for this bird; it resembled that of *Orthonyx*, except that the inside was not lined with moss, but with the litter from a large mass of parasitical plants that had fallen to the ground. The natives agree in asserting that the eggs are only laid in the cold weather, by which I apprehend they mean the spring, as I shot a young bird about four months old, on the 24th of November, which had the whole of the body still covered with a brown and greyish down. I have seen this species take some extraordinary jumps of not less than ten feet from the ground on to a convenient branch, whence it continues to ascend in successive leaps, until it has attained a sufficient elevation to enable it to take flight into the gully below."

NORTHERN LYRE-BIRD.

Gould then gave some notes by Dr. Stephenson, forwarded to him by Dr. Bennett, and better ones by A. A. Leycester, who appears to have been the co-worker with Dr. Stephenson on the subject. Leycester's notes read: "These birds hitherto have been found only on the Richmond and Tweed Rivers, in the dense brushes which clothe the mountains in these districts; and what is most remarkable, though similar mountains and brushes exist on the rivers both north and south of these rivers, yet the *M. alberti* is never to be found in them, their boundary appearing to be limited to a patch of country not wider than eighty by sixty miles. The habits of *Menura alberti* are very similar to *M. superba*. Having seen and watched both on their playgrounds I find the *M. alberti* is far superior in its powers of mocking and imitating the cries and songs of others of the feathered race to the *M. superba*; its own peculiar cry or song is also different, being of a much louder and fuller tone. I once listened to one of these birds that had taken up its quarters within two hundred yards of a sawyer's hut, and he had made himself perfect with all the noises of the sawyer's homestead—the crowing of the cocks, the cackling of the hens, and the barking and howling of the dogs, and even the painful screeching of the sharpening or filing of the saw. I have never seen more than a pair together. Each bird appears to have its own walk or boundary and never to infringe on the other's ground; for I have heard them day after day in the same place and seldom nearer than a quarter of a mile to each other. Whilst singing, they spread their tails over their heads like a Peacock, and droop their wings to the ground, and at the same time scratch and peck up the earth. They sing mornings and evenings, and more so in winter than at any other time. The young cocks do not sing until they get their full tails, which, I fancy, is not until the fourth year, having shot them in four different stages; the two centre, curved feathers are the last to make their appearance. They live entirely upon small insects, principally beetles. Their flesh is not eatable, being dark, dry and tough, and quite unlike other birds. They commence building their nests in May, lay in June and have young in July. They generally place their nests on the side of some steep rock, where there is sufficient room to form a lodgment, so that no animals or vermin can approach. The nest is constructed of small sticks, interwoven with moss and fibres of roots, the inside being lined with the skeleton leaf of the parasitical tree fern, resembling horse hair and covered in with the entrance on the side. The single egg laid is of a very dark colour, appearing as if it had been blotched over with ink. The young bird for the first month is covered with down, and remains in the nest about six weeks before it takes its departure. Aboriginal name, 'Colwin.'"

Nothing has since been added, so that sixty years have now elapsed

THE BIRDS OF AUSTRALIA.

without any further scientific advancement with regard to the economics of such a very peculiar avian form. It may now be too late, otherwise it would be one of the most valuable contributions to Australian ornithology were some one to make a special study of this bird.

It may be noted that Bonaparte gets the credit for the species name of this fine bird, as he apparently saw the bird in Gould's hands and drew up a description for his *Conspectus Genera Avium*. Gould appears to have exhibited the bird and prepared an account of it before the Zoological Society of London in 1850, but this was not published at that time. He had a plate prepared for his *Supplement*, which came out in 1851. In the meanwhile Bonaparte's description had been issued, and therefore has prior claim.

I separated the South Queensland form subspecifically so that two subspecies have been named

Harriwhitea alberti alberti (Bonaparte)

Northern New South Wales.

Harriwhitea alberti rufa (Mathews)

South Queensland.

GENUS—GLOBICERA.

GLOBICERA Bonaparte, Comptes Rendus Acad. Sci.,
Paris, Vol. XXXIX., p. 1072, (about Dec. 11)
1854.. .. . Type *G. pacifica*.

THIS genus, hitherto unacknowledged as Australian, is distinguished from *Myristicivora* by its different coloration and diagnostically by the prominent cere at the base of the bill. It is superficially allied to the well known genus so long called *Carpophaga*, the only obvious difference being the basal tumid cere. As the coloration generally agrees the genus was not recognised by genus lumpers, but now that the name *Carpophaga* must be abandoned, as it is invalid, the present name has priority over the correct substitute for *Carpophaga*, viz., *Muscadivores* Gray 1855. Consequently if the distinction be denied the name *Globicera* must come into use instead of *Muscadivores*. It may as well be again noted that the *Conspectus Gen. Av.*, Vol. II., p. 30, where it appears as a new name on the sheet bearing date Nov. 8, 1854, was not published until after April 15, 1855.

Order COLUMBIFORMES.

No. 418.

Family TRERONIDÆ.

GLOBICERA PACIFICA.

QUEENSLAND PIGEON.

(PLATE 366—lower figure.)

COLUMBA PACIFICA Gmelin, Syst. Nat., Vol. I., pt. 2, p. 777, (*ante* April 20) 1789 : Friendly Islands. Extra-limital.

Globicera pacifica queenslandica Mathews, Austral Av. Rec., Vol. II., No. 5, p. 85, Sept. 24, 1914 : Mackay, North Queensland.

Adult. Crown of head, sides of face, hind-neck, and mantle ash-grey ; entire back, upper tail-coverts, scapulars, wings, and tail bronze-green with pale coppery reflections on the back and wings ; inner webs of flight-quills blackish-brown ; tail darker than the back and inclining to steel-blue on the middle of the feathers, inner webs of the outer feathers blackish ; base of fore-head, fore-part of cheeks, chin, and throat greyish-white, becoming darker on the last ; a very narrow dark line on each side of the throat ; sides of the breast, sides of body, and thighs ash-grey, becoming darker on the last ; middle of breast, abdomen, and vent pale vinous somewhat deeper in colour on the last ; under tail-coverts chestnut ; axillaries and inner under wing-coverts ash-grey, the outer ones darker and more slate-grey ; under-surface of flight-quills vinous-brown ; lower aspect of tail black. Total length 375 mm. ; culmen 21 (?), wing 239, tail 136, tarsus 33. Figured. Collected at Mackay, Queensland, and is the type of *G. p. queenslandica*.

IN the Additions (p. xxv.) of my "List of the Birds of Australia," 1913, I added the genus *Globicera* with a species *Globicera pacifica* and a subspecies *Globicera pacifica lepida* Cassin.

This was corrected in the *Austral Av. Rec.*, Vol. II., No. 5, p. 84, Sept. 24, 1914, as follows :—

"p. xxv. Additions. Here I added the genus *Globicera* and doubtfully indicated as an Australian bird, which I had recognised from North Queensland, *Carpophaga lepida* Cassin. The bird I had was certainly a subspecies of *Globicera pacifica* (Gmelin) and I sent it to Philadelphia for comparison with Cassin's type there preserved. Mr. Stone returned it with the comment that it was quite different from Cassin's birds which Salvadori had correctly placed under the species *Globicera rubricera*.



H. Grönvold, del.

Witherby & Co

$\frac{4}{5}$
CACOMANTIS CASTANEIVENTRIS.
(CHESTNUT-BREADED CUCKOO).

$\frac{1}{2}$
GLOBICERA PACIFICA.
(QUEENSLAND PIGEON).

QUEENSLAND PIGEON.

Bonaparte, and that the locality had never been doubted. I therefore described my Queensland bird as

Globicera pacifica queenslandica.

"Differs from *G. p. pacifica* in the darker grey of the head and hind-neck, which is much more restricted; and the coloration of the underparts being vinous, obscured by bluish, this colour becoming more marked on the flanks and sides; the upper coloration being paler bronze-green. Type, Mackay, North Queensland."

I received this specimen many years ago in a collection made at Mackay but concluded it might be an alien, though the collector assured me to the contrary. It was placed aside as the island form until the discoveries of Macgillivray and Maclellennan compelled me to reconsider it, when I found it showed valid colour differences from the island birds available and could not be matched by any.

I therefore distinguished it as above, and I now publish the plate so that it will be available and incite search for it. The rediscovery of the Golden-shouldered Parrot inclines to the belief that this bird may be yet rediscovered, and will form a fine addition to our Avifauna. To show how little we really yet know of the North Queensland forms may be cited Macgillivray's record of *Lopholaimus antarcticus*, from Cape York, where he states it is regarded as a regular New Guinea migrant. I have not noticed it as yet recorded as a New Guinea species, so that it becomes obvious that we do not yet know the movements of these North Australian species or their distribution in southern New Guinea.

ORDER PROCELLARIIFORMES.

SINCE my second volume was completed much work has been done, in connection with birds of this order and, while much has been learned, we now know how ignorant we still are of the life-histories and movements of these birds. It is impossible yet to judge, but already some of my suggestions have received confirmation while others have been criticised, and altogether I much appreciate the interest they have received. In the present place I take the opportunity of figuring two additional species, one, the largest Albatross known, the other, the "unexpected" Petrel.

A series of papers by R. C. Murphy is remarkable for the close criticism of the birds themselves, the life notes from one locality and the conclusions drawn. Where any divergence of opinion appears it is put forward with personal facts to support it, and consequently these papers need especial consideration. On the other hand an ambitious essay, entitled "A Review of the Albatrosses, Petrels and Diving Petrels," by L. M. Loomis, in the *Proc. Calif. Acad. Sci.*, Vol. II., pt. II., pp. 1-187, pls. 1-17, April 22, 1918, does not advance our knowledge much in any way. Judging the *Procellariiformes* of the world from a large series of Galapagos birds he causes confusion in every possible manner. Analogy is used in an unconsidered manner and facts are presented so peculiarly that they become liable to misinterpretation. He suggests that other writers have considered individual variation as of subspecific value, whereas he appears to have misunderstood sexual, seasonal and individual variation. The conclusion—"Inasmuch as specimens taken from burrows are often worn and faded, it becomes apparent that breeding stations cannot be relied upon implicitly to furnish typical examples of geographic, or other, variations in colour"—is a bad one, as errors of omission are implied in the statement. Thus, examples might be taken from burrows at any period of the breeding season, and, of course, some would show wear.

On the other hand, in his essay on *Oceanites*, Murphy (*Bull. Amer. Mus. Nat. Hist.*, Vol. XXXVIII., March 26, 1918, p. 124) records little variation in birds from the breeding locality, the wing showing 8 mm. difference between the largest and shortest in twelve specimens, averaging 144 for the females and 145.7 for the males. Thirty-two birds of the year procured at Bahia, Brazil, show just as little variation, the males averaging

PROCELLARIIFORMES.

143.1, the females 143.8. Such figures do not indicate extensive variation, but apparently Loomis included moulting birds with half-grown wings—an absurd method. As far as can be judged, Loomis has failed to understand Petrels at all, and his work is not a guide to be commended. Thus he is quite happy in lumping all the Wedge-tailed Shearwaters under one specific name, without any attempt to inquire into the differences observed, writing: "To Dr. Goodman belongs the credit of having first suggested in print that *Puffinus cuneatus* Salvin is a synonym of *Puffinus chlororhynchus* Lesson, the type specimens representing respectively the light and dark phases of a single species. The series before me illustrates fairly well the variations shown in specimens from the Revilla Gigedo, Hawaiian, Kermadec and Seychelles Islands. Intergradation is complete throughout this series, there being no constant differences either in colour or size." Thus bill and feet coloration is ignored which might prove a good feature. I shall deal with one or two items, as I am now figuring three Petrels, and will cite the matters in discussion in connection with them.

Loomis' Essay includes a good sketch of the literature of this group up to, but ignoring, my treatment in this work, which was to a great extent novel and deserved mention in this connection. This note alone suggests prejudice, and, once prejudice is allowed to sway judgment, results cannot be accurately determined. In considering Loomis' attempt I have endeavoured to eliminate any feeling and would indicate my approval of certain points just as freely as I disapprove of his poor treatment, but further allow for this failure by accepting lack of material, literature and initiative. The Geographic Distribution shows a novel discrimination into distribution areas, divided into Super-areas, Areas, and Sub-areas. As these are drawn up from literature no criticism is necessary, and little of value is shown. Examination of certain statements discloses items worth consideration in connection with other forms. Thus, commenting upon the few cases of discontinuous distribution, such as that of Harcourt's and Bulwer's Petrels, he concludes this "ceases to be an enigma when viewed from the standpoint of a waterway between North and South America, which geologists tell us existed as late as the Miocene Period." The enigma still persists in the fact that subspecific distinction has not become marked during that length of time. Again, the usage of large generic groups conceals the fact that the Albatrosses of the North Pacific are specialised in their bill formation in a manner quite different from the southern groups, of which he recognises three genera. Again, admitting the aforesaid waterway between the Pacific and Atlantic

THE BIRDS OF AUSTRALIA.

to which group would the fossil Atlantic Albatrosses be referable? Further, should we regard *Bulweria* as an unchanged Miocene remnant or conclude that whatever alteration may have taken place has agreed *exactly* in both distant seas.

Under Migration some novel ideas are written down as if absolute facts, whereas little support to them is adduced. Nevertheless, some of the novelty may later be recognised as a valuable contribution when facts are added. Thus as fact is written: "The longest transequatorial migration is that of the Sooty Shearwater," denying the suggestion that has been put forward doubting this, without offering any evidence whatever. He cites the Californian form as arriving in spring and departing in autumn, concluding: "Furthermore, the period of absence from Californian waters coincides with the breeding season in the South Temperate Zone." This is contradicted by his own figures, here reproduced. "Jan., 5 specimens; Feb., 13 sp.; March, 1 sp.; April, 14 sp.; May, 46 sp.; June, 32 sp.; July, 14 sp.; Aug., 16 sp.; Sept., 35 sp.; Oct., 29 sp.; Nov., 12 sp.; Dec., 6 sp." I give these to show the uselessness of figures, as the above would suggest nothing like Loomis' definite statement. He concluded that birds observed in numbers in February were the vanguard of the year's migration, but the birds are still engaged in breeding in February in the Southern Hemisphere. Being confronted with further annoying data in connection with the Slender-billed Shearwater, Loomis wrote: "The fact that the Slender-billed Shearwaters are late and irregular in their occurrence off Point Pinos is of peculiar interest, creating the doubt whether they are really returning migrants bound for South American breeding stations, or whether they are strays that have missed their way and falling in with the rearguard of the Sooty Shearwaters have come down the wrong coast, the American instead of the Asiatic." The suggestion of a South American breeding station is a novelty in connection with this species, as none is known, and confirms my own suggestion as to breeding places for these birds which Loomis has been at great pains otherwise to discount. It is conclusive that the Slender-billed Shearwater does not come from the North Pacific down the Asiatic coast to breed in Bass Straits, and when Loomis accepts that as a fact a step forward will be made. It may be conceded that partial migrations take place on the West American coasts; but facts are necessary, and these may prove to be, like the breeding of the Sooty Shearwater on the Pescadores Islands, unpalatable to Loomis, but nevertheless valuable truths.

Loomis' conclusions regarding Migration may be correct, but that term as thus determined would be inapplicable to the movements of Petrels

PROCELLARIIFORMES.

generally. It might be used in connection with a few species, but even then it would be unwise, as the movements are local as far as we know at present.

Under Variation he regards dichromatism as a dominant condition in many Petrels, but his interpretation of dichromatism is perplexing, writing: "in the Giant Fulmar, Fulmar, Short-footed Petrel, Neglected Petrel, and Wedge-tailed Shearwater the bicolouration has been proven to be dichromatic," adding: "the Wedge-tailed Shearwater appears to be represented only by the dark phase on the Kermadec Islands. He might have added also—"East and West Australia, Lord Howe and Norfolk Islands," as no light phase is known from any of these localities.

The section comprising Classification and Nomenclature begins:—
"*Species*. Bird species are realities, not concepts, and their identification is not in any way dependent upon a knowledge of their distribution. . .
Subspecies. In theory, subspecies are incipient species; in fact, subspecies are attempts to forecast the future of geographic variation, which no one can foresee. . . . In the present paper . . . the subspecies theory being discarded as a theory that has outlived its usefulness." Again: "I heartily agree that the genealogy of birds is a subject to be considered apart from bird classification."

With the above in view, many of the idiosyncrasies apparent in the paper become negligible, as no present day systematist with any pretence to accuracy or authority would accept the dogmatism without much reservation. I will deal more fully with some of the peculiar results Loomis achieves through his acceptance of these views.

GENUS—REINHOLDIA.

REINHOLDIA Mathews, Austral Av. Rec., Vol. I.,
No. 5, p. 107, Dec. 24, 1912 Type *R. reinholdi*.
Cinathisma Hull, Bull. No. 5 Roy. Austral. Orn. Union,
p. 1, Dec. 21st, 1915 Type *R. reinholdi*.

I SEPARATED this genus as follows:

“Differs from *Puffinus* in its proportionately longer bill and much shorter tail, the latter being less than one-third the length of the wing and not twice the length of the exposed culmen.”

Iredale (*Austral Av. Rec.*, Vol. II., No. 1, p. 17, Aug. 2, 1913) added: “The bill is ‘puffinoid’ in character, as exemplified in the figures given by Mathews (*Birds of Australia*, Vol. II., 1912, p. 130), but is peculiar in its extreme length and weak nail; in the fully downy nestling the exposed culmen measures 30 mm., while in the fully adult it only measures 35 mm., the difference may be best expressed by comparison with the young of *P. assimilis gavia*, where the bill in the fully downy nestling only measures 16 mm. against that in the adult of 27; the nail in the downy nestling is just one-third the length of the culmen, whereas in *P. a. gavia* it is about one half, a difference in proportion which constitutes a great distinction in this group.”

More observations on bill features of downy birds are required before the full value of such records can be fairly utilised, but the shortened tail of this species in conjunction with the lengthened bill justify the retention of this generic group. And Hull, as above, also made a new genus for this species.



H Grönvold. del

Witherby & Co

$\frac{3}{2}$

REINHOLDIA REINHOLDI.
(FLUTTERING PETREL.)

Order PROCELLARIIFORMES.

Family PROCELLARIIDÆ.

No. 419.

REINHOLDIA REINHOLDI.

FLUTTERING PETREL.

(PLATE 367.)

Puffinus reinholdi reinholdi Mathews, Birds Austr., Vol. II., p. 74, May 30, 1912 :
New Zealand.

Reinholdia reinholdi byroni Mathews, Austral Av. Rec., Vol. I., No. 8, p. 187, March 20,
1913 : Byron Bay, New South Wales=Five Islands, South of Woollongong, New
South Wales ; *id.*, Bull. B.O.C., Vol. XXXVI., 89, 1916.

Cinathisma cyaneoleuca Hull, Bull. No. 5 Roy. Austral. Orn. Union, p. 1. Dec. 21, 1915 :
off Ulladulla, N.S.W. ; Emu, Vol. XV., pt. 3, p. 205, January, 1916 ; pt. 4, p. 207,
pl. XXXII., April, 1916 ; Mathews, Austral Av. Rec., Vol. III., No. 4, p. 77,
July 21, 1917.

Cf. Mathews, Birds of Australia, Vol. II., p. 74, 1912.

Adult. General colour of the upper-surface including the crown of the head, back, wings, and tail, sooty-black with whitish philo tips to the feathers on the hinder-crown, sides of face and nape ; the margins of the greater upper wing-coverts rather paler ; inner webs of flight-quills much paler, especially on the basal portion ; sides of face and sides of neck paler than the upper-surface and inclining to smoke-brown ; the feathers in front of the eye greyish-white with black hair-like tips ; throat, breast, abdomen, under tail-coverts, and under wing-coverts white ; sides of breast, lower flanks and thighs dark dusky-brown ; axillaries and inner under wing-coverts pale dusky-brown with dark shaft lines to the feathers and whitish margins at the tips ; under-surface of flight-quills greyish-brown ; lower aspect of tail similar but the long white under tail-coverts reaching nearly to the tip of the tail. Bill horn ; eyes black ; feet cream ; inner toe and inner side of tarsus brown. Total length 338 mm. ; culmen 35, wing 206, tail 69, tarsus 40. Figured. Collected at Five Islands, off Woollongong, New South Wales, in February, 1913. (The sexes are alike.)

IN the first part of my second volume, published May 30, 1912, I included p. 74, *Puffinus reinholdi reinholdi* and *P. r. huttoni* from the Snares : the former being credited with only three records of stragglers met with on the mainland, one from Victoria Park, Sydney, and one from Bondi Beach : to the latter I assigned a specimen in the British Museum received from the South Australian Museum, and thence labelled Adelaide. As

THE BIRDS OF AUSTRALIA.

there is no original label I now dismiss this skin; and reject *P. r. huttoni* from our Avifauna.

On p. 72 I doubted Hull's suggestion (*Emu*, Vol. XI., p. 207) that certain birds he only saw were certainly *assimilis*, and in this connection the further investigations made by Hull proved my doubt of accepting such records, as Hull found they belonged to the present species.

Thus in the *Emu*, Vol. XV., Jan. 1916, p. 206, Hull describes *Cinathisma cyaneoleuca* gen. and sp. nov. from specimens met with in the open sea off Ulladulla, New South Wales, commenting: "This bird has a remarkable short fluttering flight, quite unlike that of any other members of the *Puffinidæ* common to the New South Wales coast." A figure of the bill accompanied this note.

In the succeeding number a coloured figure was given (pl. xxxii.) and an extended account, but no further detail was added. Though Hull disagreed with my identification of previous birds secured, as "*Puffinus gavia* = *Reinholdia reinholdi byroni*," no explicit reason is given.

It seems here worth while discussing the recent disintegration of the *Puffinus* series and its criticism.

My first separation was in connection with the present species, for which I introduced alone the genus name *Reinholdia*. I then added *Neonectris*, while simultaneously Iredale introduced *Hemipuffinus*. This was followed by my proposal of *Alphapuffinus*, and the last to be indicated was *Calonectris*, two earlier names *Thyellodroma* and *Ardenna* being revived. In making these innovations full value was given to structural characters and colour scheme was also recognised.

This disintegration has been fairly criticised by Oberholser in the *Auk*, Vol. XXXIV., n.s. No. 4, pp. 471-475, Oct., 1917, with the conclusion that *Calonectris*, *Ardenna*, *Thyellodroma* and *Puffinus* are recognised as valid genera. Such a result is pleasing, as it is inevitable that with more material and better knowledge of the group more genera would have been accepted by that worker, who claims a very high place among American ornithologists as a systematist. Thus he regards *Hemipuffinus* as only worth subgeneric rank under *Ardenna*, which is certainly wrong, the resemblance being only superficial, the immature showing valid bill differences. *Neonectris* he merged in *Puffinus* as well as *Alphapuffinus*: while the latter is very close to *Puffinus*, the former is superficially different, and it is very probable that again we are confronted with convergence in superficial features, which do not correctly represent real affinity. As *Reinholdia* was not mentioned, I can only conclude that Oberholser might have also lumped it with *Puffinus*, but if so it would appear to be an

FLUTTERING PETREL.

incorrect conclusion. Hull determined this as a valid genus from his experience with it in life, but so little is on record as to the habits of these birds that we cannot gauge as to the value of his observations. Observers have noted the great difference in life between *Alphapuffinus* and *Thyellodroma*, for instance, while the latter seems to recall that of *Puffinus* sensu stricto, to judge by published accounts. In view of these results it seems wise to maintain the groups I recognised in my "List," until future investigation compels their acceptance or rejection. By this remark I mean complete study from all points of view, not merely the opinion based on examination of a few skins.

At the same time Oberholser showed that my *Puffinus couesi* was needless, as the two different diagnoses of *P. opisthomelas* Coues and *P. auricularis* Townsend referred to two different birds, and not to the same bird, as I concluded. This has been accepted by Loomis, who gives the differential characters of the two species, but I am quite unable to understand from literature what is meant by this writer. The characters here accepted as valid are written off as of no value at all in connection with other allied forms. Oberholser's comments are not very clear either, and I suggest that more work is necessary in connection with the two species, for judging from Loomis' account there cannot possibly be two "species," and this conclusion alone necessitates reconsideration, while the geography of the habitats of the two "species" shows the absurdity of biased judgments in connection with these birds. The type of Coues' species was procured at Cape San Lucas, Lower California, two or three hours' flight from the Revilla Gigedo group, whence was described Townsend's species. Apparently all Lower Californian birds were referred to the first named by Loomis, breeding birds from the group being considered the latter. After this no separation was allowed between birds from Bass Strait and California, an extraordinary corollary. I will again point out that Coues' description applies better to the Revilla Gigedo bird than to the Monterey one, but now accept the fact that there is only one species and that it is doubtful whether two subspecies are well distinguished.

Reading Loomis again, I see that both species are recognised as breeding in the Revilla Gigedo group, Townsend's species being restricted to Clarion Island, while Coues' name is applied to the birds breeding on Natividad and San Benito Islands. *Such a conclusion certainly supports my suggestion above given that two species do not exist.*

Loomis further considers that : " Obviously *Puffinus bannermani* Mathews and Iredale (*Ibis*, 1915, p. 594) is a variation of *Puffinus auricularis* C. H. Townsend." If this be accepted no confusion could be expected between

THE BIRDS OF AUSTRALIA.

this and the Monterey bird I called *P. couesi*, so that it is conclusively clear that no reliance can possibly be placed upon written accounts of these birds and not too much upon the results of criticism of few specimens.

Having reached this conclusion, it is necessary to record that Loomis rejects my name for the present species, maintaining Forster's name of *Puffinus gavia*, stating that "in some specimens the sooty black of the upper parts has a bluish cast in certain lights," and then adds a note regarding Hull's *Cinathisma cyaneoleuca*, concluding: "Mr. Mathew's contention respecting the identity of *Procellaria gavia* J. R. Forster wholly breaks down, the species having a brown as well as a bluish phase."

Loomis then lumps all the *obscurus-assimilis* group as referable to one species, the two I separated being regarded as colour phases, writing: "I have grouped under *Puffinus obscurus* several book species, believing them to be merely variations of a single widely distributed and essentially non-migratory species. The material before me confirms that the intergradation is complete between the brownish-backed and bluish-backed birds, and that they are not separable as distinct species. Perhaps the explanation of the dual coloration is to be found in dichromatism, more or less modified by geographic variation." Then Loomis does not catalogue any save Galapagos birds, so we are left in doubt as to whether he has studied the matter he dismisses so lightly. It is quite certain, however, that much more and better work must be done in connection with these Petrels before we can consider the matter in a dogmatic fashion. I endeavoured to deal with the matter without prejudice and with much study, and have since reconsidered the items as new material has become available, and will do so again without any consideration save the arrival at the truth. Thus, while disagreeing with Loomis' treatment I appreciate his remarks in connection with the present species, and will certainly attempt a revision when toponotypical series are at hand. With regard to the *obscurus-assimilis* association, I can only maintain the conclusions I arrived at until we have more knowledge on the subject.

It is noteworthy that the notes on the Galapagos birds referred to, *P. obscurus*, state: "The flight is usually low and somewhat undulatory, ascendant during the rapid wing-strokes (which vary from four or five to eight or ten) and descendant during the short sail."

This suggests the flight of the present species, on account of which Hull named it the "Fluttering Petrel."



H. Grönvold, del.

Witherby & Co.

PTERODROMA INEXPECTATA.
(MOTTLED PETREL).

Order PROCELLARIIFORMES.

No. 420.

Family PROCELLARIIDÆ.

PTERODROMA INEXPECTATA.

MOTTLED PETREL.

(PLATE 368.)

PROCELLARIA INEXPECTATA Forster, Descr. Anim. (ed. Licht), p. 204, (pref. Jan. 1) 1844 :
Seas south of New Zealand.

Pterodroma inexpectata thompsoni Mathews, Austral Av. Rec., Vol. II., No. 7, p. 125, Jan.
28, 1915 : East Australia.

Adult male. General colour of the upper-surface hoary-grey, with white bases to the feathers, which show through the grey in many places; the tips of the feathers on the head, back, scapulars, and short upper tail-coverts dark brown or blackish; lesser and marginal upper wing-coverts, bastard-wing, primary-coverts, and outer webs of flight-quills blackish-brown; the inner webs of the last for the greater part white; median and greater upper wing-coverts and secondary-quills hoary-grey with narrow white edgings on the outer webs, the inner webs for the most part white, except the innermost where both webs are grey; long upper tail-coverts and tail-feathers pale slate-grey, except the two outer ones on each of the latter, which are mottled with white; fore-head and sides of face, including the feathers surrounding the eyes, white with minute dark tips to the feathers; chin and throat pure white; breast, abdomen, and sides of body dusky-brown with white bases to the feathers which show through and impart a mixture of brown and white, some of the feathers on the sides of the body and lower flanks are barred with white and dusky-brown; under tail-coverts cream-white and reach the tip of the tail; axillaries white, mottled and barred with dusky-brown; under wing-coverts blackish-brown, more or less mottled and blotched with white; under-surface of flight-quills for the greater part white with pale brown along the shafts and at the tips of the primaries and grey tips to the secondaries; lower aspect of tail grey, the two outer feathers on each sides mottled with white, almost the whole of the tail below is obscured by the under tail-coverts, which are cream-white. Bill black, tarsus fleshy, feet black with base of inner web whitish. Total length 283 mm.; culmen 25, wing 251, tail 93, tarsus 35. Figured. Collected at Circular Head, Tasmania, on the 6th February, 1890, and is the type of *P. i. thompsoni* Mathews.

THIS species is only known as yet as breeding in south New Zealand and the islands south of New Zealand. A specimen was described as a new species as *Æstrelata fischeri* by Ridgway from St. Paul, Kodiak Island, Alaska: another of the same form from the North Atlantic as *Æstrelata scalaris* by Brewster.

THE BIRDS OF AUSTRALIA.

Loomis records seven specimens shot on November 19, 1906, in latitude $35^{\circ} 40'$ N., longitude $133^{\circ} 10'$ and $14'$ W.; adds, "A male from near Kiska Island, June 17, 1911"; and concludes: "The Mottled Petrel is a wide ranging species, breeding in the Southern Hemisphere and visiting the Northern Hemisphere after the period of reproduction." He observes: "According to Mr. Gifford, the sexual organs were small in the seven Expedition birds" *i.e.*, those secured on November 19, 1906. He lumps all the above, explaining away the observed differences by "wear" and "fresher plumage," as the case may need. It is apparent that the November birds were not going to breed in New Zealand that year. It is also more than probable that an American breeding locality is indicated. The dates, June for Alaska and November for 35° N., suggest a northern breeding station, which, while a novel proposal, may be the source of the birds.

I have maintained that injudicious lumping is more fatal to the advancement of ornithological knowledge than splitting, however ill-considered it may appear. In the present case the recognition of different names keeps a peculiar problem in full sight, whereas the acceptance of such a lumping hides facts which may lead to the solution of the problem presented. There is a problem, as Brewster's *scalaris* still exists, and the route of its wanderings is difficult to map. I know Palæarctic students have refused to see any difficulty in the arrival of a north New Zealand bird in the middle of the British Islands, but still the study of a map suggests no easy means of travel.



H. Grönvold, del.

Witherby & Co.

$\frac{1}{4}$
DIOMEDEA CHIONOPTERA.
(SNOWY ALBATROS.)

Order PROCELLARIIFORMES.

Family DIOMEDEIDÆ.

No. 421.

DIOMEDEA CHIONOPTERA.

SNOWY ALBATROSS.

(PLATE 369.)

DIOMEDEA CHIONOPTERA Salvin, Cat. Birds Brit. Mus., Vol. XXV., p. 443 (pref. Dec. 16, 1895)–1896 : Kerguelen Island.

Diomedea exulans rohui Mathews, Austral Av. Rec., Vol. II., No. 7, p. 125, Jan. 28, 1915 : Sydney, New South Wales.

Cf. Mathews, Birds of Australia, Vol. II., p. 257, 1912.

Adult female. Entire head and neck all round, back, rump, and upper tail-coverts, breast, sides of body, abdomen, under tail-coverts, axillaries and under wing-coverts pure white ; scapulars white mottled with greyish-brown subterminally, chiefly on the outer webs ; upper wing-coverts also white mottled and externally marked with greyish-brown ; bastard-wing dark brown, the inner webs for the most part white ; primary-coverts and primary-quills white at the base, dark brown on the terminal half, the white encroaching farthest towards the tips on the inner webs, shafts of outer primary-quills straw-colour and much flattened ; secondary-quills similar, but the dark pattern almost restricted to the outer webs, the white reaching to the tips on the inner webs and sometimes encroaching along the margins of the outer webs ; under-surface of quills similar to that of above but many of the secondaries pure white ; tail white both above and below with the outer feathers on each side marked and mottled with greyish-brown. Bill pinkish-cream ; eyes black, feet cream. Total length 1,050 mm. ; culmen 165, wing, 600 tail 195, tarsus 123. Figured. Collected at Broken Bay, near Sydney, New South Wales. This is the type of *D. e. rohui* Mathews.

It seems just to reproduce Loomis' treatment of these birds in full.

“*Diomedea exulans* Linnæus

“Synonyms : *Diomedea regia* and *D. chionoptera*.

“Mr. Salvin has interpreted an extreme white phase, long attributed to *Diomedea exulans*, to be an undescribed species, christening it *Diomedea chionoptera*. An Albatross (No. 11342) in the Academy's collection, obtained from a French sailor on the bark *Guerveur*, and said by him to have been captured during January, 1908, in latitude 48° S. longitude 50° W. agrees with Mr. Salvin's description of *D. chionoptera*, save in the coloration of the back, which is not free from faint vermiculations. This specimen also has irregular traces of grey on the tail,

THE BIRDS OF AUSTRALIA.

evidencing that it is not in the highest plumage; being merely in a transitional stage. Another specimen (No. 11341 C.A.S.) from the same locality has the appearance of an immature bird. The crown is heavily clouded with sooty-brown, the hind-neck is obscurely vermiculated, the back is distinctly vermiculated, and the white of the inner-webs of the primaries is concealed. No. 15548 U.S. Nat. Mus. is intermediate between the two Academy specimens, the three examples forming a succession terminating in the high *D. chionoptera* plumage. In supporting the claim of *D. chionoptera* for recognition, Dr. Godman infers that the nestlings of *D. chionoptera* are white, and that those of *D. exulans* are grey. The adults being indistinguishable, such a condition would prove only that a dichromatism exists in the young, as in *Diomedea irrorata*.

"*Diomedea regia* Buller is also considered to be a mere variation. The characters propounded for the supposed adult are fairly midway between those Mr. Salvin assigns to *D. exulans* and to *D. chionoptera*.

"The explanation of the diverse plumages of *Diomedea exulans*, I believe, is to be found in dichromatism and age variation, there being a dark phase and a light phase which coalesce in maturity, somewhat as in *Diomedea irrorata*.

"Recently Mr. Gregory M. Mathews has revived *Diomedæa epomophora* Lesson, relegating to its synonymy *Diomedea regia* Buller, and dilating on the shape of the bill as a diagnostic character. The extensive series now under review show that the individuals of Tubinarine species are subject to much variation in the form and size of the bill.

"A later candidate for recognition is *Diomedea sanfordi* Murphy, separated from *D. exulans* on the basis of variation in one specimen. Especial value is attached to the shape of the nasal tubes. This character, however, is a highly variable one in the *Diomedææ*."

The preceding should serve as a warning to would-be lumpers arguing from analogy, as the three species, *exulans*, *chionoptera* and *epomophora*, are "realities, not concepts," and "present peculiar characters that separate them from each other."

The data given by Loomis exposes his inability to understand this group, his apology reading: "In some of the species I have been hampered in the determination of distinguishing characters by lack of specimens."

Thus, the bill features of *regia* are constant, as is evidenced by the recognition by Murphy, as his *D. sanfordi* is that species. While Murphy laid stress on the shape of the nostrils, I gave particulars of the shape of the bill, and the close study I made of the group convinced

SNOWY ALBATROSS.

me of the coincidence that Murphy and I could each discriminate the species by this means. That this group is difficult is seen by the following quotation from the *Bull. Brit. Orn. Club*, Vol. XXXVIII., No. CCXXX., Jan. 28, 1918, p. 39: "Lord Rothschild further made the following remarks on a recently described Albatross:—In Article XXXV. of the *Bulletin of the American Museum of Natural History*, Vol. XXXVII., pp. 861-864, Dec. 10, 1917, Mr. Robert Cushman Murphy describes a new Albatross, collected by Mr. R. H. Beck, on the Chilian coast, and which he calls *Diomedea sanfordi*. This bird he compares with *exulans* and *epomophora* (= *regia*). He even goes so far as to establish a new sub-genus *Rhothonia* for it. On reading the description I was at once struck by the fact that the differences mentioned were exactly those separating *chionoptera* and *exulans*. On comparing my old and young *chionoptera* from Kerguelen Island (Robert Hall coll.) this was confirmed, and, moreover, we have at Tring a specimen of the latter from Sydney Harbour, belonging to Mr. Mathews, and there is a record for West Australia. This shows that the bigger Albatrosses fly far and wide, out of the breeding season, and so could easily reach the coasts of S. America. Mr. Mathews has, in his book, made *chionoptera* a subspecies of *exulans*, but this, to my mind, is doubtful, and Mr. Mathews is inclined, also, now to doubt this. To sum up *D. sanfordi* Murph. = *D. chionoptera* Salv."

This necessitated the reconsideration of the material, and when I studied my series I found that the form which had been distinguished as *chionoptera* really did represent a species which is separated from the whitest form of what is called *exulans* by its large size and the *white-wedge mark* on the inner-web of the primaries. Series have not been collected even on Kerguelen Land, where apparently this species breeds and has no plumage changes, taking on the mature plumage from the nest. The recognition of the species from Sydney Harbour indicates that it breeds somewhere in the New Zealand seas. I have a young specimen procured by Mr. Roy Bell, at Norfolk Island, showing the same perfect plumage, the only difference being the less white wing-pattern and slightly more vermiculation. This suggests that some of the colonies on the New Zealand islets may be of this species and the source of these specimens.

Iredale (*Austral Avian Record*, Vol. II., No. 1, p. 29, Aug. 2, 1913) wrote: "Exceptionally fine *D. exulans rothschildi* Mathews, though freely vermiculated on the upper-back, were also considered '5th year.'" It is suggested that these were *chionoptera*, as the distinguishing features of the species were, at that time, unknown to Iredale. No definite

THE BIRDS OF AUSTRALIA.

locality is stated for those, so that we are still at a loss as to the breeding station, but it appears that the Antipodes Island birds are all dark so-called immature *exulans*. It seems impossible to accept Loomis' theory of dual immature stages with identical adult forms, as the adults are far from identical. It should be noted that the bill features of *chionoptera* agree with those of *exulans* and differ notably from those of *regia* auct. = *Rhothonia* subgen. The latter is not definitely known from Australian waters at the present time, but in addition to Neozelanic breeding stations it may breed off the South American extremity on either or both sides, as, while Beck procured a specimen off the Chilian coast, there is another in the Museum at Buenos Ayres obtained near there at Bahia Blanca, a photo of which was sent me by Dr. Dabbene, Director, Zool. Section, Buenos Ayres Museum, Argentine, S.A.

The recognition of the species at three such distant places cannot all be placed to the credit of wanderers, as, peculiarly enough, these two larger, whiter species are stated by all observers to be more wary and less easy to secure.



H. Grönvold, del

Witherby & Co

PSEPHOTELLUS CHRYSOPTERYGIUS.
(GOLDEN-SHOULDERED PARROT).

Order PSITTACIFORMES.

No. 422.

Family PLATYCERCIDÆ,

PSEPHOTELLUS CHRYSOPTERYGIUS.

GOLDEN-SHOULDERED PARROT.

(PLATE 370.)

PSEPHOTUS CHRYSOPTERYGIUS Gould, Proc. Zool. Soc. (Lond.), 1857, p. 220, 1858 : Interior Gulf of Carpentaria = Normanton.

Psephotellus chrysopterygius nova Mathews, Austral Av. Rec., Vol. III., No. 6, p. 159, June 25, 1918 ; Watson River, Gulf of Carpentaria, North Queensland.

Cf. Mathews, Birds of Australia, Vol. VI., p. 425, 1917.

Adult male. Fore-head, lores, and feathers below the eye pale lemon-yellow, slightly tinged with greenish-blue ; crown of head and nape deep black, becoming paler on the hind-neck, where the feathers are fringed with blue ; upper back, scapulars, and lesser upper wing-coverts earth-brown ; median upper wing-coverts old-gold-yellow ; bastard-wing black on the inner webs, bluish on the outer ones ; outer greater upper wing-coverts, primary-coverts and flight-quills black fringed with blue on the outer webs, the blue becoming paler on the primary-quills towards the tips, where the inner webs are also paler ; inner greater coverts and innermost secondaries broadly fringed with earth-brown ; sides of hinder-crown, sides of neck, cheeks, and sides of throat turquoise-blue like the fore-neck, breast, sides of body, lower back, rump, and upper tail-coverts ; chin and middle of throat grey ; middle tail-feathers dull dark blue, tinged with bronze, and inclining to blackish at the tips, outer feathers pale blue with more or less white or whitish on the apical portions, which increases in extent towards the middle ones ; abdomen and under tail-coverts scarlet with white bases to the feathers and fringed with white at the tips ; under wing-coverts blue, but darker than the breast and sides of the body, and becoming paler on the margin of the wing, the greater series and under-surface of flight-quills glossy black ; lower aspect of tail pale blue at the base, becoming paler and inclining to white sub-terminally and blackish at the tips. Bill pale leaden-blue, cutting edge darker ; eyes brown ; feet fleshy-brown. Total length 275 mm. ; culmen 14, wing 119, tail 149, tarsus 15. Figured. Collected on Watson's River, Gulf of Carpentaria, North Queensland, on the 14th of April, 1915, and is the type of *P. c. nova* Mathews.

Adult female. Crown of head bronze-brown ; hind-neck, back, scapulars, and wings dull grass-green like the sides of the face, breast and under tail-coverts ; throat grey like the sides of the face, which is tinged with bronze-green ; lower breast, upper abdomen, sides of body and under wing-coverts pale blue ; lower back, rump, and upper tail-coverts turquoise-blue ; middle tail-feathers blue with a tinge of bronze at the base and becoming blackish at the tips, the outer feathers paler blue with blackish outer margins to those nearest the middle and dull white at the tips ; bastard-wing, outer greater upper wing-coverts, primary-coverts,

THE BIRDS OF AUSTRALIA.

and flight-quills blackish margined with blue or greenish-blue on the outer webs, some of the flight-quills marked with white at the base on the inner webs; abdomen, lower flanks, and under tail-coverts greyish-green; the feathers on the abdomen and lower flanks red, white at the base and fringed with white at the tips; greater series of under wing-coverts and under-surface of flight-quills blackish-brown, some of the latter marked with white; lower aspect of tail blue at the base, white subterminally, and black at the tip. Total length 245 mm.; culmen 15, wing 111, tail 131, tarsus 14. Figured.

MACGILLIVRAY recorded in the *Emu*, Vol. XVII., p. 189, 1918, *Psephotus chrysopterygius*, Golden-shouldered Parrot. On the 14th April, 1915, Mr. M'Lennan made the following notes when on the Watson River: "On reaching the river a pair of strange Parakeets was flushed from a thin fringe of mangroves; they flew off up the river and disappeared in a big patch of mangrove. I followed and searched for about an hour, but did not see them. Returning along the edge of the mangrove, I saw one of the Parakeets flying in from the plain. It alighted in the mangroves, and I managed to secure it."

This serves to introduce one of the most important discoveries that Messrs. Macgillivray and MacLennan have made, namely, the recognition that the Golden-shouldered Parrot is not yet extinct, as feared when I wrote my last volume. Dr. Macgillivray mentioned this item to me when visiting me recently, and, moreover, wrote to Australia, had the specimen forwarded and presented it to me. From this bird I have had the accompanying plate prepared, and have reinstated the bird as a species distinct from *P. dissimilis*, which I had united to it in the preceding volume.

As the species was rediscovered at some distance from the type locality, I compared my specimens with the unique types, and found good subspecific differences, though only a few specimens were available. My birds show a much more extensive yellow fore-head, while the sides of the face are greenish not as blue as in the type; the breast also being greenish, not clear blue, while the black cap extends further on the nape: the greater secondary-coverts have the outermost sandy-grey, whereas they are blue in the type, the inner only sandy edged with blue; the primary-coverts blacker, the primary edgings lighter. The plate will show the distinctions from the Black-hooded Parrot, the only available specimens being the types which are rough, unmade skins in which it is difficult to determine the valid features.

NORTHIPSITTA ALEXANDRÆ, Vol. VI., p. 271, pl. 297.

The Marquess of Tavistock, writing of these birds in captivity, says that the male has a lilac-blue crown, a purplish-blue rump, and the pale green

ADDENDA.

patch on the wing larger and more conspicuous. The female has the crown dove-colour tinged with leaden-grey and the rump bluish-grey; no real blue in either. The display of these birds is peculiar and utterly unlike that of other Parakeets, including *Polytelis swainsonii*. The male begins by uttering various cries, some harsh, some shrill, and also whistles in different keys, at times slowly, at times rapidly. If a female shows interest in this performance he approaches her with a quick run, his head held high, his neck stretched upwards and his plumage kept close and tight, the bird's elegant form and beautiful colouring being thereby exhibited to the best advantage. The male then, as a rule, bobs his head up and down a few times and utters a low chacking noise very like that sometimes made by an angry cock Broadtail on the approach of a rival. On getting quite close to the female he finishes the exhibition by gazing very intently into her face, and every now and then rapidly rubbing his beak on the side of the branch nearest to her. The female displays to the male in an exactly similar way, though she does not begin by whistling and usually waits for him to furnish this vocal prelude. From observation of captive birds I am inclined to think the species is not monogamous, but very 'Cuckoo' in its conjugal affairs. The female alone appears to care for the young, though the male does not molest them when they leave the nest."

Obs. In the *Austral Av. Rec.*, Vol. III., pt. 5, p. 128, Dec. 28th, 1917, I described *Erythrotriorchis radiatus queenslandicus*. This bird is identical with the one figured by me in my *Birds of Australia*, Vol. V., pl. 240, except that the white abdomen is lacking, the under-surface being a uniform rufous colour.

ADDENDA.

Through the confusion of publication of Reichenbach's, Bonaparte's and Cabani's work the correct generic name for the Spotted-sided Finch was left in abeyance. I have now determined that Bonaparte preceded Cabanis, so that we arrive at the following conclusions:—

Stagonopleura Reichenbach, *Av. Syst. Nat.*, pl. LXXV., is based on figures of beak, wing, tail and feet, and is accurately indeterminable. This *may* have been published in June 1850, but that is not certain.

In the *Conspectus Gen. Av.*, Vol. I., p. 456, which was published before Feb. 1851, Bonaparte introduced *Steganopleura* as of "Reichenb.," but marked with a * to indicate this was the first publication. He included thereunder *bichenowii* Vig., *annulosa* Gould, *ruficauda* Gould and *modesta* Gould. These are now referred to three different genera, and all of the same time of proposal, but as one was preoccupied it has been

THE BIRDS OF AUSTRALIA.

recently re-named. As this is also the genus name of the two first-named species it seems proper to supersede it. I, therefore, designate "*bichenovii* Vig." as type of *Steganopleura* Bonaparte, and this name will displace *Stizoptera* Oberholser 1899 of my "List" 1913, p. 299.

I here propose *Tavistocka* for *Loxia guttata* Shaw, and this name must be used for *Stagonopleura* "Reichenb." of my "List" 1913, p. 297.

The reason of the confusion is traced to Cabanis, who in the *Mus. Hein.*, Vol. I., p. 172 (after Oct. 23, 1851) used *Stagonopleura* Reichenb. 1850 for this species, claiming that Bonaparte's usage was of this kind. Gray in the *Cat. Gen. Subgen. Birds*, p. 76, 1855, followed Cabanis, and this usage has commonly prevailed, but it is impossible to uphold it any longer.

So we have—

<i>Tavistocka guttata</i>	and <i>Steganopleura bichenovii</i>
<i>Tavistocka guttata guttata</i>	<i>Steganopleura bichenovii pallescens</i>
<i>Tavistocka guttata philordi</i>	<i>Steganopleura bichenovii bandi</i>
	<i>Steganopleura bichenovii annulosa</i>

PSEPHOTELLUS DISSIMILIS, cf. Mathews, *Birds Austr.*, Vol. VI., p. 425.

Nest. In a white ants' (Termites) nest.

Eggs. Clutch 4? White, 18½ mm. by 22.

Breeding-season. April?

APPENDICES.

APPENDIX A.

The following Works contain all the New Names :—

BIRDS OF AUSTRALIA. Vols. 1-7 (1910-1919).

AUSTRAL AVIAN RECORD. Vols. 1-3 (1912-1918).

IBIS. 1912, pp. 212-215 ; 1913, pp. 201-263, 402-452* ; 1914, pp. 91-132, 293-297* ; 1915, pp. 76-85, 572-609* ; 1916, 295-305 ; 1917, pp. 564-611† ; 1918, pp. 115-127.

BULLETIN OF THE BRITISH ORNITHOLOGISTS' CLUB from 1907 to 1918. Vol. XXI., pp. 13, 100, 110 ; XXIII., pp. 24-25 ; XXV., pp. 24, 34, 85, 100, 117 ; XXVII., pp. 16, 17, 28, 40, 41, 48, 62, 68, 87, 95-97, 99-101 ; XXXI., pp. 55-56, 68 ; XXXV., pp. 35-37, 81-2, 121 ; XXXVI., pp. 48, 61, 77, 82-3, 89-92 ; XXXVIII., p. 48 ; XXXIX., pp. 23-24.

AUK. 1913, pp. 92-95 ; 1914, pp. 86-91 ; 1915, pp. 195-197.

BRITISH BIRDS. 1912, Vol. VI., p. 58.

NOVITATES ZOOLOGICÆ. 1910, pp. 492-504 ; 1911, pp. 1-23 ; 1912, pp. 171-455, 627-656.

AVICULTURAL MAGAZINE. 1913, Vol. IV. (3rd Series), pp. 151-153.

VICTORIAN NATURALIST. 1912, Vol. XXIX., pp. 7-16.*

SOUTH AUSTRALIAN ORNITHOLOGIST. 1914 to date.

Vol. I., pt. 2, pp. 12-13, 15-17 ; pt. 3, p. 18. Vol. II., pp. 15-20, 29-33, 56-62, 83-87, 109-113, 170-178, 200-204. Vol. III., pp. 12-17, 34-38, 68-75, 109-113, 137-141, 174-180, 205-208, 225-229.

EMU, 1908 to date.

Vol. VII., Supplement and Index, pp. 1-123. Vol. VIII., p. 34, with coloured plate A ; pp. 113-114, with coloured Plate B. Vol. IX., pp. 1-16, 53-69, 92, 98, 238-241, 246. Vol. X., p. 1, with coloured plate C, 57, 103-110, 317-326, 341. Vol. XI., pp. 52-58, 105 with coloured plate D, 255-257. Vol. XII., pp. 49-51, 204-206 with coloured plate E. Vol. XIV., p. 1 with coloured plate F, 60. Vol. XV., pp. 33-34, 118-130, 171-176. Vol. XVI., pp. 34-36, 180-185. Vol. XVII., pp. 100-103, 157-159. Vol. XVIII., pp. 82-88.

* With Tom Iredale.

† With Tom Carter.

THE BIRDS OF AUSTRALIA.

The following Extra-limital Genera have been described in my *Birds of Australia* :—

Vol. I.	Page	Type
Mantellornis	249	<i>Notornis hochstetteri</i> Meyer
Vol. II.		
Nesofregetta	31	<i>F. mæstissima</i> Salvin
Leucanous	432	<i>Gygis microrhyncha</i> Saunders
Atalolestris	500	<i>Stercorarius longicaudus</i> Vieillot
Vol. III.		
Prohæmatopus	12	<i>Hæmatopus quoyi</i> Brabourne & Chubb
Afribyx	41	<i>Vanellus lateralis</i> Smith
Rogibyx	41	<i>Xiphidiopterus cucullatus</i> Temminck
Pagolla	83	<i>Charadrius wilsonia</i> Ord
Pernettyva	114	„ <i>falklandicus</i> Latham
Helenægialus	114	<i>Ægialitis sanctæhelenæ</i> Harting
Paroxyechus	114	<i>Charadrius placida</i> Gray
Afroxyechus	124	„ <i>tricollaris</i> Vieillot
Zarapita	168	<i>Numenius tenuirostris</i> Vieillot
Parascolopax	290	<i>Scolopax saturata</i> Hodgson
Chubbia	291	<i>Gallinago stricklandi</i> Gray
Homoscolopax	291	„ <i>imperialis</i> Sclater
Neospilura	293	„ <i>solitaria</i> Hodgson
Macrodura	294	„ <i>nobilis</i> Sclater
Odurella	294	<i>Scolopax brasiliensis</i> Swainson
Eugallinago	294	<i>Gallinago macrodactyla</i> Bonaparte
Subglareola	321	<i>Glareola ocularis</i> Verreaux
Hemigarzetta	448	<i>Herodias euolphotes</i> Swinhoe
Vol. V.		
Nesobaza	213	<i>Nesobaza madagascariensis</i> (Smith)
Vol. VI.		
Cruopsitta	64	<i>Cyclopsittacus edwardsii</i> Oustalet
Nannopsittacus	65	<i>Cyclopsitta suavissima</i> Sclater
= Suavipsitta xix.		
Layardiella	289	<i>Psittacus tabuensis</i> Gmelin
Vol. VII.		
Euægotheles	52	<i>Ægotheles crinifrons</i> Bonaparte = <i>Æ. psilopterus</i> Gray
Cyanoceyx	96	<i>Ceyx lepida</i> Temminck
Ceycalcyon	97	„ <i>cyanopectus</i> Lafresnaye

APPENDICES.

Vol. VII.	Page	Type
Argyroceyx	97	<i>Ceyx argentata</i> Tweeddale
Ispidella	97	<i>Halcyon leucogaster</i> Fraser
Ceycoides	98	<i>Alcedo madagascariensis</i> Linné
Dacelalcyon	117	<i>Dacelalcyon confusus</i> Mathews
Lazulena	141	<i>Halcyon macleayii</i> Jardine & Selby
Halcyonopa	149	„ <i>dryas</i> Hartlaub
Chelicutona	150	<i>Alcedo albiventris</i> Scopoli
Plesialcyon	152	„ <i>smyrnensis</i> Linné
Nutchera	153	<i>Halcyon badia</i> Verreaux
Cecilia	153	<i>Alcedo pileata</i> Boddaert
Antisyma	154	„ <i>australasia</i> Vieillot
Hyposyma	154	<i>Halcyon cinnamomina</i> Swainson
Dilazula	155	„ <i>nigrocyanæa</i> Wallace
Dilazulena	155	„ <i>winchelli</i> Sharpe
Leucalcyon	156	„ <i>saurophaga</i> Gould
Melanalcyon	156	<i>Todiramphus funebris</i> Bonaparte
Todalcyon	158	„ <i>recurvirostris</i>
Edquista	198	<i>Tanysiptera carolinæ</i> Schlegel
Eximiornis	235	<i>Caprimulgus eximius</i> Temminck
Telacanthura	264	<i>Chætura ussheri</i> Sharpe
Neafrapus	264	„ <i>cassini</i> Sclater
Alterapus	264	„ <i>sabini</i> Gray
Indicapus	265	<i>Acanthylis sylvatica</i> Tickell
Zoonavena	265	<i>Chætura grandidieri</i> Schlegel
Papuanapus	266	„ <i>novæguineæ</i> D'Albertis & Salvadori
Chæturellus	267	<i>Hirundo rutula</i> Vieillot

Other Genera.

	Page	Type
Submyiagra, <i>Austral Av. Rec.</i> , Vol. 2, 1913	61	<i>Platygnaethus vanicorensis</i> Quoy et Gaimard
Arfakornis, <i>ib.</i>		<i>Microlestes arfakianus</i> Meyer
Devisornis, <i>ib.</i> , Vol. III., 1917 (With T. Iredale.)	90	<i>Malurus alboscapulatus</i> Meyer
Phæorhadina, <i>ib.</i>	116	<i>Phillopneuste fuscata</i> Blyth
Euolor, <i>ib.</i>	117	<i>Anas olor</i> Gmelin
Haringtonia, <i>ib.</i>	124	<i>Haringtonia psaroides</i>
Richmondina, <i>ib.</i>	145	<i>Loxia cardinalis</i> Linné.
Promergus, <i>Ibis</i> , 1913	410	<i>Mergus australis</i> Hombron et Jacquinot

THE BIRDS OF AUSTRALIA.

	Page	Type
Mesocarbo, <i>Ibis</i> , 1913	415	<i>Carbo sulcirostris</i> Brandt
Maorigerygone, <i>ib.</i>	437	<i>Curruca igata</i> Quoy et Gaimard
Nesomiro, <i>ib.</i>	440	<i>Miro traversi</i> Buller
Bannermania, <i>ib.</i> , 1915	578	<i>Procellaria hornbyi</i> Gray
Calonectris, <i>ib.</i>	592	<i>Puffinus leucomelas</i> Temminck
Microzalias, <i>ib.</i>	597	„ <i>nativitatis</i> Streets

The following Extra-limital Birds have been described in my *Birds of Australia*.

Vol. I.			Page
Eulabeornis philippensis	sethsmithi		197
„	„	goodsoni	197
„	„	swindellsi	198
„	„	lesouëfi	198
„	„	chandleri	198
„	„	wilkinsoni	198
„	„	andrewsi	199
„	tricolor	grayi	205
Eudyptula minor	iredalei		286
Vol. II.			
Oceanites nereis	couesi		18
„	„	chubbi	18
Pelagodroma marina	maoriana		24
Fregetta tubulata			42
Puffinus couesi			67
„	assimilis	kempi	69
„	lherminieri	becki	70
„	„	boydi	70
„	reinholdi	reinholdi	74
„	„	huttoni	77
„	pacificus	hamiltoni	82
„	„	alleni	83
„	„	laysani	83
„	carneipes	hakodate	90
„	„	carbonarius	90
Procellaria æquinoctialis	mixta		111
„	„	brabournei	113
„	„	steadii	114

APPENDICES.

Vol. II.	Page
Pagodroma nivea novegeorgica	177
„ confusa	177
Macronectes giganteus solanderi	187
„ „ halli	187
„ „ wilsoni	189
„ „ forsteri	189
Prion vittatus keyteli	210
„ „ macgillivrayi	211
„ „ salvini	212
Pseudoprion turtur eatoni	220
„ „ solanderi	220
„ „ huttoni	220
„ „ crassirostris	221
Heteroprion desolatus peringueyi	230
„ „ macquariensis	231
„ „ alter	231
Pelecanoides urinatrix coppingeri	238
Puffinuria garnoti lessoni	239
„ „ magellani	239
Thalassarche melanophris richmondi	272
Thalassogeron chrysostoma harterti	280
Phoebetria palpebrata antarctica	303
Hydrochelidon leucopareia leggei	320
„ „ delalandii	320
„ „ swinhoei	320
Gelochelidon nilotica addenda	331
„ „ gronvoldi	331
Thalasseus bergii bakeri	346
„ „ edwardsi	347
„ bengalensis arabicus	355
Sterna dougallii bangsi	364
„ „ arideensis	364
Sternula nereis exsul	385
Melanosterna anæthetus recognita	403
Megalopterus minutus americanus	423
„ „ atlanticus	423
Procelsterna cerulea nebouxi	431
„ „ imitatrix	431
Gygis alba monte	443

THE BIRDS OF AUSTRALIA.

Vol. II.		Page
Bruchigavia novæhollandiæ forsteri		457
Catharacta lonnbergi clarkei		494
„ „ intercedens		494
„ maccormicki wilsoni		495
The following New Names also occur in Vol. II. :—		
Procellaria saltatrix	} = Garrodia nereis {	16
„ longipes		17
„ aquorea	} = Pelagodroma sp. {	23
„ passerina		24
Nectris carbonaria = Hemipuffinus carneipes		91
Procellaria fuliginosa (not Gmelin, p. 562, 1789) = Procellaria æquinoctialis		113
„ pallipes = Pterodroma cinereus		123
„ sandaliata = P. incerta		151
„ agilis, from Easter Island		152
„ vagabunda = Æstrelata lessoni		155
„ lugens = Pterodroma inexpectata		159
„ velificans		161
„ sordida		162
„ atrata		163
„ crepidata		164
Diomedea profuga = Nealbatrus chlororhynchus		285
„ antarctica = Phœbetria palpebrata		302
Vol. III.		
Hypsibates leucocephalus timorensis		150
Vol. IV.		
Phalacrocorax carbo indicus		171
Fregata minor rothschildi		280
Scæophæthon rubricauda rothschildi		303
„ „ brevirostris		303
Leptophæthon lepturus ascensionis		311
Vol. V.		
Circus assimilis quirindus		23
Haliastur sphenurus sarasini		169
Megastrix tenebricosa perconfusa		408
Vol. VI.		
Probosciger aterrimus oorti		94
Kakatoe galerita aruensis		187

APPENDICES.

Vol. VII.	Page
Alcyone azurea wallaceana	94
„ „ distincta	94
Syma torotoro pseustes	113
„ „ wellsi	113
„ „ connectens	114
Dacelalcyon confusus	117
Dacelo leachii superfluus	140
Rossornis macrurus aruensis	242
Cuculus waigoui	291

Other Extra-limital Birds described.

Chrysococcyx layardi, *Austral Av. Rec.*, Vol. I., p. 16, 1912.

Podargus papuensis conigravi, *Nov. Zool.*, Vol. XVIII., p. 281, 1912.

Eopsaltria verreauxi, *Austral Av. Rec.*, Vol. II., p. 71, 1913.

Fregata minor nicolli, *ib.*, p. 118, 1914.

„ „ aldabrensis, *ib.*, p. 119.

„ „ listeri, *ib.*

„ „ magnificens, *ib.*, p. 120.

„ „ ridgwayi, *ib.*

„ andrewsi, *ib.*

„ ariel iredalei, *ib.*, p. 121.

Reinholdia reinholdi melanotis, *Bull. Brit. Orn. Club*, Vol. XXXVI., p. 89, 1916 (7th July).

(With T. Iredale.)

Æstelata oliveri, *Austral Av. Rec.*, Vol. II., p. 113, 1914.

Prothemadera novæseelandiæ kermadecensis, *ib.*

Porzanoidea plumbea oliveri, *ib.*, p. 114.

Reguloides humei præmium, *ib.*, Vol. III., p. 45, 1915.

Eos grayi, *ib.*, p. 46.

Pyrrhula pyrrhula nesa, *ib.*, p. 122, 1917.

Hydroprogne tschegrava oliveri *Ibis*, 1913 p. 242

Sterna vittata bollonsi 244

Sternula nereis davisæ 245

Herodias alba maoriana 404

Carbo carbo steadi 411

Circus approximans drummondi 419

Nesierax pottsii 420

Cyanoramphus auriceps macleani 426

Strigops habroptilus innominatus 427

THE BIRDS OF AUSTRALIA.

Strigops habroptilus parsonsi	<i>Ibis</i> , 1913	p.	427
Sauropatis sanctus forsteri			429
Acanthisitta chloris granti			432
Myiomoira macrocephala marrineri			436
Rhipidura flabellifera kemp			441
Gallirallus townsoni	1914		295
Cymochorea owstoni	1915		581
Puffinus bannermani			594
Neonectris griseus pescadoresi			602
Bulweria bulweri pacifica			607

APPENDIX B.

DATES OF ORNITHOLOGICAL WORKS.

THE following compilation is the first attempt to provide a means for the determination of the exact dates of publication of works dealing with Ornithology.

I here give those ascertained in connection with the works cited in my "List of the Birds of Australia," or the place of appearance of such data as a means of reference.

My friends, C. Davies Sherborn and C. W. Richmond, are the only two who need special recognition, as these workers have collated many difficult works, and any collations I have made have been developed through their initiative. Both have also much more material than I possess, but it is not easily available.

The present list is incomplete and imperfect, but will serve as a basis and will show what I have brought together. If similar lists were published in connection with American and European birds, the bulk of ornithological works would be brought under survey.

This seems a necessary preliminary to the preparation of accurate Lists, but the problem has never yet been skilfully handled. A few European works are here mentioned, but no attempt has been made to deal with them in detail. Little care has been taken even by the most accurate workers, as I find a well-known worker often citing inaccurate dates without any investigation whatever. I therefore look to one of the younger generation for the compilation of a similar list to the one here presented.

Many of the items that follow are familiar to a few workers, but some entirely novel are included, and it is put forward as a base *only*.

ANNALS AND MAGAZINE NATURAL HISTORY. At the present time published monthly on the first of each month, and six months constitute a volume, twenty volumes (*i.e.* ten years) forming a series. It is necessary to remember that at the beginning there were two opposition magazines, of which this is the survivor.

THE BIRDS OF AUSTRALIA.

The earliest Magazine of Natural History was edited by Loudon, the first part being published on May 1, 1828, and this appeared every two months. This was continued under the editorship of Charlesworth, when Jardine began an opposition *Mag. Zool. Bot.*, which took the field and survived under the above name.

ANNALS PARIS MUSEUM. Sherborn, in the *Annals Mag. Nat. Hist.*, Ser. 8, Vol. XIII., March 1914, p. 365, has collated with great difficulty this publication as well as the *Mémoires Paris Mus.*

ANNALS SCI. NAT. PARIS. The dates of this periodical are generally accepted as given in the press, but I am doubtful of the accuracy of all.

AUK. The organ of the American Ornithologists' Union, which appears quarterly, Jan., April, July and October, and has borne this name since 1883, when it succeeded the *Bulletin* of the Nuttall Ornithological Club, founded eight years previously. As far as I know it has appeared regularly, as instance, Jan. 1917, issued Jan. 2; April 1917, issued March 31; and July 1917, June 30.

AUSTRAL AVIAN RECORD. Issued irregularly in connection with the Austral Avian Museum, Foulis Court, Fair Oak, Hants, England. The dates of publication are as follows:

Vol. I.	No. 1	pp. 1- 24	January	2, 1912
		2	April	2, 1912
		3	June	28, 1912
		4	September	18, 1912
		5	December	24, 1912
		6 & 7	February	28, 1913
		8 (i.-iv.)	March	20, 1913
		196		
Vol. II.	No. 1	pp. 1- 32	August	2, 1913
		2 & 3	October	23, 1913
		4	December	29, 1913
		5	September	24, 1914
		6	December	19, 1914
		7	January	28, 1915
		8 (i.-iv.)	August	16, 1915
		220		
Vol. III.	No. 1	pp. 1- 24	June	30, 1915
		2	November	19, 1915
		3	April	7, 1916
		4	July	21, 1917
		5	December	28, 1917
		6	June	25, 1918

APPENDICES.

AUSTR. MUS. CATALOGUES. Catalogues on various subjects were issued by the Australian Museum, those referring to birds being entitled *Catalogue* No. 4. Four parts were issued as follows: pt. I, Accipitres, 1876; pt. II, Striges, 1890; pt. III., Psittaci, 1891; and pt. IV., Picariæ, 1894. A second edition of pts. I. and II. was issued on 1898. This was edited and corrected by A. J. North, the first four parts being prepared by E. P. Ramsay.

Catalogue No. 12 was issued for North's Nests and Eggs of Birds breeding in Australia and Tasmania, and an entirely new edition of this was published as *Austr. Mus. Special Catalogue*, No. 1. I give details of these under the author's name, North.

BARTRAM. *Travels in Carolina*, 1791. German translation in 1793 by Zimmermann. See *Auk*, Vol. XXXI., No. 1, Jan., 1914, pp. 86-91.

BECHSTEIN. *Ornith. Taschenb.* Vol. I., 1802. Vol. II., 1803. According to Richmond (3), p. 581 footnote, reviewed in the *Allg. Lit. Zeitung*, 1804, Vol II., No. 168, June 8, 1804, col. 542.

BILLBERG. *Synopsis Faunæ Scandinaviæ*. Contents of this rare work have been given in the *Austral Avian Record*, Vol. II., pts. 2 and 3, Oct. 23, 1913, pp. 33-48, but the date, 1828, is only as yet known.

BLYTH. *Cat. Birds Mus. Asiatic Society*. The title page is dated 1849, but preface indicates that such was printing date only, and this is dated JUNE 20, 1852. The facts are that the book was set up and proof sheets printed off in 1849, and these were sent to specialists in Europe for correction: all such were added in Appendices, which appear in front of the text proper; a footnote on p. IX. quotes the *Revue Zool.*, 1851.

BODDAERT. *Tabl. des Planch. Enlum.* The preface is dated Dec. 1, 1783. Some notes on this book appeared in the *Austral Avian Record*, Vol. III, No. 2, Nov. 19, 1915, pp. 31-51.

BOIE. Two important articles appeared in the *Isis* (Oken), the first in Heft 5, May 1822, the other in Heft 10, October 1826.

BONAPARTE. There is much difficulty in connection with the many and complex writings of this brilliant ornithologist. A peculiarity, which needs care in acceptance, was his correction in his separata. Many articles printed in the *Comptes Rendus Acad. Sci. Paris*, were later issued with additions incorporated, and such give trouble. In his well-known unfinished work, the *Conspectus Generum Avium*, he dated his manuscript, and these were accepted as dates of publication until I pointed out the error.

In his recent paper (*Proc. U.S. Nat. Mus.*, Vol. 53, Aug. 16, 1917)

THE BIRDS OF AUSTRALIA.

Richmond has given some valuable items which are here made use of. *Comp. List Birds Europe and America* was published in Jan. 1838, and is reviewed in Charlesworth's *Mag. Nat. Hist.*, Vol. II., for April 1838.

Many of his articles are known from the reprints and have been commonly quoted by abbreviations. Richmond's notes are:

C.S.O. This has been cited for the *Consp. Syst. Ornith.*, published in *Ann. Sci. Nat. Paris Zool.*, Ser. 4, Vol. I., Nos. 2 and 3, pp. 105-152. These two numbers were received by the Acad. Sci. Paris, May 15 and June 26, 1854.

C.V.Z. = *Consp. Vol. Zygod.*, published in *Ateneo Italiano*, Vol. 2, No. 8, May 1854, pp. 116-129: received Paris before June 5, 1854.

C.V.A. = *Consp. Vol. Aniso*, published *ibid.*, No. 11, Aug. 1854, pp. 311-321; received Paris before Aug. 28, 1854: the ostensible date of publication of the *Ateneo* being the 15th of month.

Saggio = *Saggio distrib. Metod. Anim. verteb.*, published in parts in the *Giorna Accad. Roma*. I have not the exact dates of publication of this Journal, but in 1911 I noted "though Vol. LII., p. 208, is usually quoted as 1831, it was not published until well on in the year 1832."

Consp. Gen. Av. Richmond states that two editions of the first volume exist, and that it was issued in two parts: pt. I being received on or before June 24, 1850, by the Paris Academy, while pt. II. was acknowledged Feb. 3, 1851. The pages included in pt. I. are not known, Richmond suggesting 272. Regarding the second volume Richmond has a note: "If Bonaparte's *Conspectus*, Vol. 2, p. 138, is accepted from 1854, the genus will stand as *Gorsachius*." I do not understand this, as the page is dated "15 Mars, 1855," where the genus is credited to Pucheran.

My own results give pp. 1-159 were issued in 1855 after April 15, pp. 161-184 did not appear until 1856, while pp. 185 to end were published after Bonaparte's death, a note being given which is dated Oct. 1, 1857.

BONNATERRE, see *Ency. Meth.*

BRANDT. *Descr. Icon. Anim. Russ. Nov. Aves*, fasc. I., 1836. This is apparently all that was published, though references to other plates appear in literature but are regarded as referring to prepared, but not published, plates.

See under Tchihatcheff.

BREHM. *Vogel Deutschl.*, preface dated July 1831. Title page 1831.
Vogelfang, „ „ 8 Nov., 1854. „ „ 1855.

BRISSON. *Ornithologia*. The six volumes were apparently published in one item in 1760. No other date known to me.

APPENDICES.

BROWN, CAPT. THOS. *Illustrations Genera Birds*. This rare work appeared in quarto parts. The first part on April 1, 1845, and monthly afterwards, neither the plates or text numbered or paged. I have seen pts. V., Aug. 1845, pt. VI., Sept. 1845, pt. VII., Oct. 1845, and pt. IX., Dec. 1845, each with 4 col. pls. and 8 pp. text, the October number having an additional plain plate.

BRUNNICH. *Orn. Boreal*. Preface dated Feb. 20, 1764.

BULLER. *Essay New Zealand Ornith.* Pref. dated Feb. 1, 1865. *Hist. Birds New Zealand*, pt. I., pp. 1-72 ? March 1872 ; pt. II., pp. 73-148 ? June 1872 ; pts. III. and IV., pp. 149-300 ? Dec. 1872 ; and pt. V., pp. 301 ? to end, April 1873. 2nd Edition was published fifteen years afterward, and I have prepared the following collation, which may need a little alteration :

						Received
						Brit. Mus.
						Date
Vol. I.	pt. I.	pp.	1- 32	pls.	4	July 1887
	II.		72		4	Oct. 1887
	III.		120		4	Jan. 1888
	IV. V. & VI.		236		12	March 1888
	VII.		237-250			May 1888
& pp. I.-LXXXIV.						June 8
Vol. II.	pts. VIII. & IX.	pp.	1-104	pls.	9	Aug. 1888
	X. & XI.		224		7	Nov. 1888
	XII. & XIII.		359		10	Dec. 1888
& pp. I.-xv.						Feb. 20 1889

Seventeen years later a Supplement was published which was distributed in two volumes :

Vol. I. with 5 pls., pref. March, received Brit. Mus. Aug. 5 1905
 II. „ 7 pls. „ „ „ „ „ „ Oct. 27 1906

The two volumes were, however, reviewed in the *Ibis* for July 1906.

BULLETIN BRIT. ORN. CLUB. Published with a short account of the meetings of the British Ornithologists' Club held monthly during the months from October to June inclusive and each *Bulletin* bears the date of issue, but in some cases this is not exactly correct.

BULLETIN SCI. NAT. (FERUSSAC). This *Bulletin* was devoted to reviews of current literature, but original articles were also accepted. Hence new birds were described, while it is a very valuable record by which publication of other scientific works may be traced. The dates are rather

THE BIRDS OF AUSTRALIA.

complex and have not yet been exactly collated, those given on the parts being accepted.

CABANIS. *Mus. Heineanum*. The title page of Vol. I. bears the date 1850-1851. Items have been quoted as 1850 as no dates appear until p. 107, which is dated Jan. 1851. I now conclude that Cabanis adopted this method from Bonaparte, and these dates are only MS. ones and not those of publication. Thus this first date appears on the second page of Sheet 14 (not the first): sheet 15 is dated Februar; 16, Marz; 17, April; 18, Mai; 19, June; 20, July; 21, Aug.; 22, Aug. 10; 23, Aug.; 24, Sept. 1; 25, Sept. 10; 26, Sept. 8; 27, Oct. 8; 28, Oct. 23; 29, Oct. 23. The preface is dated Oct. 1851. That these are not publication dates is proved by the fact that on p. 43 a footnote quotes Bonaparte's *Consp. Gen. Av.*, 1850, p. 287, and a similar footnote to p. 53 cites p. 320. These pages are in the portion quoted as 1850 but Bonaparte, p. 320, did not appear until Feb. 1851. As far as I can trace the volume was published *in one item* at some date after Oct. 23, 1851, and as confirmation I do not find the book included in the literature of 1850, but in that of 1851.

Similarly the second volume bears on the title 1859-60. The Vorwort is dated 1859, but the last date in the book itself is Jan. 20, 1860.

The third volume has on the title 1860, the last date in the book being Nov. 1, 1860.

The fourth volume is dated 1862-63, but the last signature is Dec. 30, 1863.

I conclude that the approximately correct dates are:

Vol. I. 1851 after Oct. 23: Vol. II. 1860 after Jan. 20

Vol. III. 1860 after Nov. 1: Vol. IV. 1864 after Dec. 30, 1863.

Cabanis also founded the *Journal für Ornithologie*, which see.

CAMPBELL. *Nests and Eggs Australian Birds*, published in two vols. in 1901, acknowledged in Melbourne, *Vict. Nat.*, Vol. XVII., p. 206, April 4, 1901.

CATALOGUE OF THE BIRDS IN THE BRITISH MUSEUM. This is the most important systematic work dealing with Ornithology yet published. The preface dates are intended for dates of publication, and I here give such with Contents and name of Authors, as such a List is often needed.

Vol.	Pref. date.	Contents.	Author.
1	June 1, 1874	Hawks	Sharpe
2	Dec., 1875	Owls	Sharpe
3	June, 1877	Crows, Paradise Birds, etc.	Sharpe

APPENDICES.

Vol.	Pref. date.	Contents.	Author.
4	March, 1879	Cuckoo, Shrikes and Fly-catchers	Sharpe
5	Jan. 14, 1881	Warblers and Thrushes	Seebohm
6	Dec. 26, 1881	Babbling Thrushes, pt. I	Sharpe
7	July 1, 1883	Ditto, pt. II.	Sharpe
8	June 28, 1883	Titmice, Shrikes, Creepers, etc.	Gadow
9	Feb. 11, 1884	Sunbirds and Honey-eaters	Gadow
10	March 9, 1885	Swallows, Wagtails, etc.	Sharpe
11	May 7, 1886	Tanagers, etc.	P. L. Sclater
12	Jan. 6, 1888	Finches	Sharpe
13	May 14, 1890	Wood Swallows, Starlings, Lyre Birds, etc.	Sharpe
14	May 17, 1888	Tyrant Birds, Pittas, etc.	P. L. Sclater
15	March 7, 1890	Dendrocolaptine Birds, etc.	P. L. Sclater
16	June 12, 1892	Humming Birds, Swifts, etc.	Salvin, Hartert
17	June 1, 1892	Rollers, Kingfishers, etc.	Sharpe
18	June 9, 1890	Woodpeckers	Hargitt
19	March 28, 1891	Cuckoos, Barbets, etc.	Shelley, P. L. Sclater
20	Dec. 13, 1891	Parrots	Salvadori
21	June 30, 1893	Pigeons	Salvadori
22	Nov. 17, 1893	Game Birds	Ogilvie-Grant
23	Feb. 28, 1894	Rails, Cranes, Bustards, etc.	Sharpe
24	July 10, 1896	Plovers, Sandpipers, etc.	Sharpe
25	Dec. 16, 1895	Gulls, Terns, Petrels	Saunders, Salvin
26	Sept. 30, 1898	Herons, Gannets and Penguins	Sharpe, Ogilvie-Grant
27	Sept. 6, 1895	Ducks, Tinamous and Struthious Birds	Salvadori

COMPTES RENDUS. Reports of the meetings of the Academy of Sciences of Paris, which were published weekly within the week, six months constituting a volume. This vehicle was made use of by Bonaparte when preparing his *Conspectus*, the preliminary results being published in this paper, and then criticisms and emendations incorporated in the later work. A perplexing feature, which may be here noted, is the fact that Bonaparte published reprints of these papers, but these reprints contain alterations, emendations and even new material. I do not know whether such reprints were ever on sale, but the new species in them have been recognised.

COQUILLE. Full particulars of the dates of publication of the parts

THE BIRDS OF AUSTRALIA.

were published by Sherborn and Woodward in the *Annals and Mag. Nat. Hist.*, Ser. VII., Vol. 7, p. 391, 1901, and were reproduced by myself in the *Austral Avian Record*, Vol. II., pts. 2 and 3, Oct. 23, 1913, when I added complete details of the appearance of the plates. The birds were described by Lesson and Garnot, either in collaboration or independently, and many were previously published in the *Bull. Sci. Nat. Ferussac*, which see.

CUVIER. *Tabl. Elem.*, reviewed Jan. 1798 *Bull. Sci. Soc. Philom.*, No. 10, p. 79. *Leçons d'Anat. Comp.*, Vols. I. and II. with tables, reviewed *Bull. Sci. Soc. Philom.*, No. 38, p. 112, Floreal, An 8=April 1800. *Le Règne Animal*, titles dated 1817, 4 vols. acknowledged *B.F.*, Dec. 7, 1816. The 2nd edition appears in the same place, as follows: Vols. I., II., IV. and V., April 11, 1829; Vol. III., March 27, 1830. Many later editions and translations have appeared of the *Animal Kingdom*, a notable one being Griffith and Pidgeon's, which see.

DAUDIN. *Traité d'Orn.*, Vol. I., reviewed in the *Bull. Sci. Soc. Philom.*, No. 35, p. 88, Pluviose, An 8=Jan. 1800, and Vol. II. in the same place, No. 40, p. 128, Messidor, An 8=June 1800. The XIVth Volume of the Didot ed. *Hist. Nat.* (Buffon) in which Daudin gave specific names, was published in October 1802. See Sherborn, *Natural Science*, Dec. 1899, p. 406.

DICT. SCI. NAT. (Levrault). Details of publication with some notes on the ornithological articles have been given in the *Austral Avian Record*, Vol. III., pt. 1, June 30, 1915.

DIEFFENBACH. *Travels in New Zealand*. Preface dated Nov. 1842. Title page, 1843. Contains account of Birds by G. R. Gray.

DIGGLES. *Orn. of Australia*. A first attempt to give details of publication and contents was made by me in the *Austral Avian Record*, Vol. II., No. 7, pp. 137-144, Jan. 28, 1915, and a second in the third volume, No. 4, pp. 98-108, July 21, 1917. Accounts of papers in the *Trans. Philos. Soc. Queensl.* had previously been given in the first volume, No. 3, pp. 68-72, June 28, 1912, and in the second volume, No. 7, pp. 144-153, Jan. 28, 1915.

DRESSER, author of *Birds of Europe*, *Monograph of Bee-eaters*, etc.

ENCY. METH. Sherborn and Woodward in the *Annals Mag. Nat. Hist.*, Vol. XVII., Ser. 7, p. 577, 1906, have given the dates of this complex work, the items concerning us reading: *Tabl. Ency. Method Ornithologie*, by Bonnaterre. Pls. 230 to 240 were not published in 1790, but probably in 1823, as they show figures of birds not known until after 1800, and the plates are all signed "Deseve del. et dir." and are of different design and printing. As only

APPENDICES.

vernaculars appear this item is of no systematic value, but is of technical literary value.

Pls.	I.— LXXVII.	appeared in Livr.	37	1790	Date on original wrapper
	LXXVIII.—CLXXVII.		38	1790	Ditto
	CLXXVIII.—CCXXXIX.	}	40	1790	Ditto
and I.—VII. & pp. i.-lxxx.					
pp. lxxxi.-xcvii., 1-192			47	1791	Ditto
pp. 193-320			51	[1792]	Ditto

After Bonnaterre's death publication was suspended for nearly thirty years, when Vieillot completed the birds :

[pp. 321-528] appeared in Livr. 89 Ackn'd *B.F.* 6 Jan., 1821 [1820].

529-848 91 6 July, 1822.

[849-1460] 93 26 July, 1823.

DUMERIL. *Anal. Zool.*, pref. dated Sept. 18, 1805. Translation by Froriep, preface dated Sept. 17, 1806.

DUMONT. Author of articles in the *Dict. Sci. Nat.* (Levrault), which see.

EMU. A quarterly publication, the organ of the Royal Australasian Ornithologists' Union, the volumes including April, July, October and January numbers.

Bulletins have recently been "published for the sake of priority," but as these were not put on sale, and only sent to a favoured few, it seems doubtful whether such can claim consideration under the International Rules.

EREBUS & TERROR, see Gray.

EYTON. *Hist. Rarer Brit. Birds*, 1836, reviewed *Mag. Zool. Bot.* (Jardine), Vol. I., April 1837 (reviews about six months late).

Monograph Anatidæ, published June 1838, reviewed *Annals Nat. Hist.*, Vol. I., Aug. 1838 (reviews two months late).

FLEMING. *Philosophy Zoology*. The earliest review I have traced is in Froriep's *Notizen*, No. 43, July 1822.

History Brit. Animals, published in March 1828; reviewed in *Edinb. New Philos. Zool. Journal* for Jan.-March 1828, p. 412, the review being dated April 1, 1828.

FORSTER, G. *Voyage round the World*, 1777, pref. dated March 1st.

FORSTER, J. R. *Indische Zool.*, preface dated Oct. 12, 1781. *Monograph on Penguins* appeared in the *Comment. Göttingen*, the preface dated Kal. Mai 1781.

Enchiridion, noticed *Götting. Anzeiger*, March 27, 1788, p. 489. *Descr.*

THE BIRDS OF AUSTRALIA.

Anim. was posthumously edited by Lichtenstein and published in 1844, the preface being dated January. Previously some of these species had been published by Wagler in the *Syst. Av.*, 1827, and *Isis*, 1829.

FORSTER, T. *Synoptical Catalogue British Birds*, dated 1817, but it seems doubtful whether it came out in that year, as in the November number of the *Gentleman's Magazine* for 1817, p. 443, it was "Nearly ready for publication." The same words had been used in the August number, and as this periodical came out on the last day of the month it was apparently not published before December 1817. It is reviewed in the *Quart. Journ. Sci.*, No. IX., p. 196, for Jan. 1818.

FRORIÉP edited a translation of Dumeril's *Anal. Zool.*, and a journal entitled *Notizen*, which is a work of reference whence dates may be approximately gauged.

GADOW prepared *Cat. Birds Brit. Mus.*, Vols. 8 and 9, which see.

GALERIE DES OISEAUX. I have given details as far as known in the *Austral Avian Record*, Vol. II., pt. 7, Jan. 28, 1915.

GARNOT. See Coquille.

GISTEL. *Naturg. Thierr.* Title page dated 1848; preface Easter, 1847. A second edition differing only in the title page bearing the date 1850, is in my Library.

GLOGER. *Hand. und Hilfsb.*, published in parts 1841-42, exact dates not yet known to me.

Pt. I., pp. 1-80; pt. II., -160; pt. III., -240; pt. IV., -320; pt. V., -400 in 1841; pt. VI., pp. 401-496 and pp. I.-XXXXIV., pref. dated Oct. 17, 1841, probably early in 1842.

GMELIN, J. F. *Syst. Nat.* Hopkinson, in the *Proc. Zool. Soc. (Lond.)*, 1907, p. 1037, gave dates as follows:

Pt. I.	pp. 1-500 earliest notice	July 25, 1788
II.	501	April 20, 1789
III.		November 20, 1789

Pt. II. was noted in the *Götting. Anzeig.*, April 20, 1789, p. 641.

GOULD, J. The *Synopsis of the Birds of Australia* was published in four parts, the first dated Jan. 1837, the second April 1837, the third and fourth April 1838. At the end of the last was included a long series of descriptions of new birds communicated to the Zoological Society of London in 1837, and which also appeared in their *Proceedings*, but the latter was not published until December 1838. I find the first part

APPENDICES.

reviewed in the *Magazine Natural History* (Charlesworth) for January 1837, p. 51, and the second in the May number.

Birds Austr. and Adjacent Islands. Only two parts were published. Pt. I., dated August 1837, reviewed *Mag. Zool. Bot.* (Jardine), Oct. 1837 (reviews months late); pt. II., dated February 1838, reviewed *Annals Nat. Hist.*, Vol. I., May 1838 (reviews months late).

Birds Australia.

Part 1	December	1st, 1840	Part 22	March	1st, 1846
2	March	1st, 1841	23	June	1st, 1846
3	June	1st, 1841	24	September	1st, 1846
4	September	1st, 1841	25	December	1st, 1846
5	December	1st, 1841	26	March	1st, 1847
6	March	1st, 1842	27	June	1st, 1847
7	June	1st, 1842	28	September	1st, 1847
8	September	1st, 1842	29	December	1st, 1847
9	December	1st, 1842	30	March	1st, 1848
10	March	1st, 1843	31	June	1st, 1848
11	June	1st, 1843	32	September	1st, 1848
12	September	1st, 1843	33	December	1st, 1848
13	December	1st, 1843	34	December	1st, 1848
14	March	1st, 1844	35	December	1st, 1848
15	June	1st, 1844	36	December	1st, 1848
16	September	1st, 1844	Supplement		
17	December	1st, 1844	1	March	15th, 1851
18	March	1st, 1845	2	September	1st, 1855
19	June	1st, 1845	3	September	1st, 1859
20	September	1st, 1845	4	December	1st, 1867
21	December	1st, 1845	5	August	1st, 1869

Introd. Birds Austr. 8vo ed. Pref. dated June 12, 1848.

Handb. Birds Austr. 2 Vols., 1865. In the *Ibis*, April 1865: "Will appear in the course of a few months, at least one volume may." The two volumes came out together and were reviewed in *Ibis*, Jan. 1866.

GRAY, G. R. *List Genera Birds*, 1st ed. reviewed *Isis*, April 1840. 2nd ed., Sept. 1841; covers of *Annals Mag. Nat. Hist.* for Sept. and Oct. 1841. Appendix on sale April 1, 1842.

Cat. Gen. Subgen. Birds. *Introd.* dated April 6, 1855, but the earliest date of issue would appear to be October 1855, as Bonaparte laid a copy on the table at the séance of the Acad. Sci. Paris of date Oct. 22, 1855, and it was reviewed in the *Annals Mag. Nat. Hist.* for Dec. 1, 1855.

THE BIRDS OF AUSTRALIA.

Genera Birds. This work came out in parts, each bearing a date which seems to be the date of publication. In the *Annals Mag. Nat. Hist.* for March 1844, p. 216, I find a note: "Part I, Gray's *Genera* will appear with the Magazines on the 1st May."

Cat. Birds Brit. Mus. A number of small books entitled "Lists of Specimens of Birds in Brit. Mus." were issued, and in view of the case of the *Cat. Gen. Subgen. Birds* the preface dates will need verification before accepting them as dates of publication.

Handl. Gen. Sp. Birds. Pt. I, pref. dated May 10, 1869; pt. II, pref. Nov. 9, 1870; pt. III, pref. July 8, 1871.

Erebus & Terror. The birds were issued in pts.: pp. 1-8 appeared in 1844; pp. 9-20 in 1845, Pucheran stating the latter was published in October. Newton, however, quotes pt. IX., p. 9, as June, 1845.

GRAY, J. E. *Zool. Miscell.* Pt. I., 1831, pp. 1-40; pt. II., pp. 41-48, March 1842; pt. III., pp. 49-56, April 1842; pt. IV., pp. 57-72, May 1842; pt. V., pp. 73-80, June 1842; pt. VI., pp. 81-86 June 1844 (after June 29).

GRIFFITH. Edited an English translation of Cuvier's *Animal Kingdom*, which appeared in parts. The title pages bear the date 1829, but the plates are dated, the dates ranging from Nov. 1827 to Jan. 1830. A few new names occur, so that a collation would be valuable.

HARTERT has published a couple of papers on Australian Birds and many papers on the Birds of New Guinea in conjunction with Lord Rothschild in the *Novitates Zoologicæ*, which see.

Vögel der Paläarktischen Fauna. In course of publication in parts. The standard work on this Fauna. Does not need collation here.

Monographed Swifts, etc., in *Cat. Birds Brit. Mus.*, which see.

„ „ „ „ *Das Tierreich.*

Katalog Vogelsamml. Mus. Senckenb. Mitte Januar 1891.

HEINE. Possessor of a private collection known as the *Mus. Heine*, whose contents were listed by Cabanis, which see.

Heine's son collaborated with Reichenow in the production of *Nomencl. Mus. Hein.*, which has a title page dated 1882-90, but it was issued as a whole in 1890, the preface written by Reichenow being dated Sept. 1890.

HORSFIELD. Co-author with Vigors of the Australian birds in the Linnean Society's Collection in the *Trans. Linn. Soc. (Lond.)*, Vol. XV.

Zoological Researches in Java 1821-4 (see end of List).

IBIS. The journal of the British Ornithologists' Union, published

APPENDICES.

quarterly in Jan., April, July and October, appearing fairly regularly about the 1st of the month. Rarely very late, when apology is made; as instance, the number for Oct. 1905 did not come out until the end of November. Commonly quoted only with the year, the volumes are regularly numbered in series, six volumes to a series.

ILLIGER. *Prodr. Mamm. et Avium*, preface dated April 1811.

Illustr. Ornith., see Jardine & Selby.

Illustr. Zool., see Swainson, see Lesson, see Wilson.

ISIS. A German periodical edited by Oken, which appeared monthly.

JARDINE. Editor of the *Naturalists' Library*, issued at various dates and covering many subjects.

Editor of *Contributions to Ornithology*, which appeared irregularly, and collation has not been yet accurately made. At present dates on titles accepted.

Collaborated with Selby in the production of *Illustrations of Ornithology*, the details of publication of which were given by Sherborn in the *Ibis*, April 1894 and corrected in the *Ibis*, 1899, p. 483. As only the years were given for the second series, further details are required, and I here add the following: In the *Mag. Zool. Botany* (edited by Jardine) for June 1837 it is noted that the 1st number is published; parts will appear at intervals of six weeks to two months, and will each contain 6 illustrations. This first number is reviewed in the *Charlesworth Magazine* for June 1837. In the October number of Jardine's *Magazine* an advertisement states that the first and second parts have been published and that the third part is nearly ready.

JAROCKI. *Zoologia*. An overlooked work recently recorded in MS. by Sherborn, and, through his generosity, brought to the notice of ornithologists in the *Austral Avian Record*, Vol. III., pt. 6, p. 142 *et seq.*, June 25, 1918.

JOURNAL FÜR ORNITHOLOGIE. Begun by Cabanis, and six hefts published in the first year. Soon fell into arrears; as instance, Bonaparte notes that the number dated March 1856 was not published until August 1856.

KAUP. *Skizz. Entwick. Naturl. Syst.*, preface dated April 1829.

Class. Saugeth. v. Vogel, reviewed *Isis*, 1844, pt. X., October.

Many articles in the *Isis*, etc.

KERR. *Animal Kingdom*, preface dated Feb. 1792.

THE BIRDS OF AUSTRALIA.

KEYSERLING & BLASIUS. 1840, preface dated Oct. 1839. Reviewed in *Isis*, April 1840.

KING. *Survey Intertrop. Coasts Austr.* Though the title page is dated 1827 this was actually published in April 1826 and I find it reviewed in the *Dublin Philos. Journ.*, No. IV., p. 288, for May 1826.

KOCH. *Syst. Baier. Zool.*, 1816, published before July, see C. W. Richmond (2), p. 621 footnote, 1908.

KUHL. *Conspectus Psittacorum*, issued in the *Nov. Act. Phys. Acad. Leop. Carol.*, Vol. X., 1820, pref. Oct.

Monograph of the Petrels, issued in the *Beitr. Vergl. Anat.*, 1820, pref. dated April 7th.

LACEPÈDE. *Tabl. Oiseaux*. The history of this important essay was given by Sherborn in *Natural Science* for Dec. 1899, p. 406, Richmond's details being given in the *Auk*, Vol. XVI., No. 4, Oct. 1899, pp. 325-329. It was reviewed in the *Journ. General Litt. France*, Vol. III., Nivose, An 8 = (Dec 21, 1799—Jan. 19, 1800).

LATHAM. The *Suppl. Gen. Synops.* has a preface dated May 1, 1787. The *Index Ornith.* of 1790 : I have got no exact date, but it appears to have been published late in that year.

The *Suppl. Index Ornith.*, published in 1801 ; the plates, which appeared in the *Second Suppl. Gen. Synops.*, simultaneously published, are dated May 30, 1801.

The *General Synopsis of Birds* and the later *General History of Birds* were published at various dates, but do not concern the technical side of nomenclature.

LEACH. *Zool. Miscellany* appeared in parts, the first part probably being published on January 1, 1814. No details have been secured, Volume I. being dated 1814, Vol. II. 1815, Vol. III. appeared as one item on Jan. 1, 1817.

Syst. Catal. Brit. Birds, 1816, pref. dated Oct. 30, though continually quoted, was never published, while the names, being accompanied only by vernaculars, are *nomina nuda*.

LEAR. *Illustr. Psittacidæ*. I have given particulars of publication of this work in the *Austral Avian Record*, Vol. I., No. 1, p. 23, Jan. 2, 1912.

LESSON. *Manuel d'Ornith.*, published in two small volumes, acknowledged *B.F.*, June 28, 1828.

Traité d'Ornith. This larger work was undertaken as soon as the *Manuel* was published, and issued in 8 parts, the first appearing before

APPENDICES.

Feb. 13, 1830, the last June 11, 1831. I have given details in the *Nov. Zool.*, Vol. XVIII., p. 14, 1911.

Compl. de Buffon. Exact dates not yet ascertained by me.

Lesson wrote with Garnot the birds collected on the Coquille, which see.

Illustr. Zool. and *Centurie de Zool.* These works appeared in many parts, and I have given particulars in the *Nov. Zool.*, Vol. XVIII., p. 12, 1911.

Echo du Monde Savant. Lesson contributed a series of articles to this very rare periodical, and these have lately been reprinted under the editorship of Menégaux.

Descr. Mamm. et Ois. Richmond (1), p. 672 footnote, 1902, has given details of the book known under this abbreviation and states it was published in April 1847.

LEVAILLANT. *Hist. Nat. Perroquets*, Vol. I.

Vol. III. by Bourjot St. Hilaire about to be commenced, March 1837.

LEWIN. First edition, 1808, has had various notes written about it by North and myself. The former quoted a Sydney advertisement of Nov. 20, 1808, that it was coming next boat. The later editions, 1813, 1822, and 1835 have little technical value.

LICHTENSTEIN issued small *Catalogues of the Berlin Museum*, which, Richmond wrote me, contained some new names, as I have detailed in my work in connection with *Alisterus scapularis*.

Ed. I, 1816, ed. II., 1818; reprinted in *Isis*, 1818, col. 1103, *Litt. Anz.*

The well-known 1823 *Catalogue* has a preface dated September.

The still better 1854, 10th Januar.

LINNÉ. *Syst. Nat.* Xth edition, date accepted, Jan. 1758.

XIIth edition, preface dated May 24th, 1766.

LITTLER. *Handb. Birds Tasm.*, 1910. Received in London Dec. 10th.

MACGILLIVRAY. *Hist. Brit. Birds*, Vol. I., 1837, preface dated May 1st, reviewed *Jard. Mag. Zool. Bot.* for Sept. 1837 (reviews six months late); Vol. II. Preface dated June 1st, 1839.

III. „ „ June 1st, 1840. On sale July 1840.

IV. „ „ March 20th, 1852.

V. „ „ July 31st, 1852.

Rapacious Birds, Great Britain, 1836.

Manual Land Birds. Preface dated 25th Oct., 1840. On sale March 1841.

Manual Water Birds, 1842. Appendix dated 5th April.

MAG. DE ZOOLOG. This is a great source of difficulty, as the plates and text were issued irregularly and I have been unable to collate any

THE BIRDS OF AUSTRALIA.

facts. In some cases the text is dated, but even these are not reliable, as they are often dates of manuscript only, not of publication.

MAG. ZOOL. BOT., Jardine. Only two volumes were published, being followed by the *Annals Nat. Hist.*, which, taking the name *Annals Mag. Nat. Hist.*, is still a valuable journal. The dates are No. 1, June 1836; No. 2, Aug. 1836; No. 3, Oct. 1836; No. 4, Dec. 1836; No. 5, Feb. 1837; No. 6, April 1837; No. 7, June 1837; Nos. 8 and 9, Aug. 1, 1837; No. 10, Oct. 1, 1837; No. 11, Dec. 1, 1837; and No. 12, Feb. 1838.

MATHEWS. *Birds Australia*, published in parts, four or five times in the year :

Vol. I.	pt. 1	published	Oct. 31, 1910	pp. 1-96	pls. 1-19
		2	Jan. 31, 1911	136	33
		3	Apl. 29, 1911	184	45
		4	Aug. 9, 1911	183-234	58
		5	Oct. 31, 1911	286	67
		6	Jan. 31, 1912	301 &	pp. i.-xiv.
Vol. II.	pt. 1		May 30, 1912	pp. 1-120,	pls. 68-81
		2	July 31, 1912	236	94
		3	Sept. 20, 1912	356	107
		4	Nov. 1, 1912	476	120
		5	Jan. 31, 1913	527 & i.-xiv.	124
Vol. III.	pt. 1		Apl. 2, 1913	pp. 1-104	pls. 125-137
		2	May 2, 1913	204	150
		3	Aug. 18, 1913	300	166
		4	Dec. 31, 1913	380	177
		5	Mar. 26, 1914	444	189
		6	June 25, 1914	512 & i.-xvii.	199
Vol. IV.	pt. 1		Oct. 6, 1914	pp. 1-80	pls. 200-209
		2	Feb. 17, 1915	192	223
		3	June 23, 1915	334 & i.-xii.	233
Vol. V.	pt. 1		Nov. 5, 1915	pp. 1-152	pls. 234-244
		2	Feb. 29, 1916	248	254
		3	May 23, 1916	352	266
		4	Aug. 30, 1916	440 & i.-xi.	274
Vol. VI.	pt. 1		Nov. 22, 1916	pp. 1-104	pls. 275-282
		2	Feb. 6, 1917	216	290
		3	Apl. 17, 1917	296	299
		4	June 27, 1917	372	307
		5	Sept. 11, 1917	444	316
		6	Dec. 11, 1917	516 & i.-xix.	324

APPENDICES.

Vol. VII., pt. 1	published Mar. 4, 1918	pp. 1-112	pls. 325-336
2	May 15, 1918	216	342
3	Aug. 26, 1918	320	351
4	Dec. 19, 1918	384	362

Handl. Birds Australasia appeared as a Supplement to the *Emu*, Vol. VII., January 1908.

Two important papers on Nomenclature, wherein appeared many dates of publication, were included in the *Nov. Zool.*, Vol. XVII., pp. 492-503, December 15, 1910 and Vol. XVIII., pp. 1-22, June 17, 1911. In the same journal appeared the "Reference List to the Birds of Australia," Vol. XVIII., pp. 171-656, Jan. 31, 1912.

List Birds Australia was published in December 1913.

MATHEWS & IREDALE. *Reference List of the Birds of New Zealand* was published in the *Ibis*, April 1913, pp. 201-263 and July 1913, pp. 402-452. Correct quotations would be *Ibis*, Ser. 10, Vol. I., No. 2, April 2, 1913 and *Ibis*, Ser. 10, Vol. I., No. 3, July 1, 1913.

MEYER & WOLF. *Taschenb. d. Vogel*, 1810, pt. i., pp. 1-310, pref. dated Aug. 20, 1809. Pt. ii., pp. 311-614, pref. dated March, 1810.

MISCELLANY NAT. HIST. Vol. I., "Parrots by Lauder and Brown," 1833. Text quotes "New York, April 20" and advertisement states "On Nov. 16 will be published another work."

MILLER. *Var. Subj. Nat. Hist.*, plates only bearing dates, that of *Aptenodytes* dated 1778. See Riley, *Auk*, 1908, p. 269, for further notes, and republished as *Cimelia Physica*, 1796.

MÜLLER, P. L. S. *Suppl. Natursyst.*, preface dated Jan. 4, 1776.

MULLER, S. *Verhandl. Nat. Gesch. Land- en Volken-*. I have given dates as far as yet known in the *Austral Avian Record*, Vol. I., No. 1, p. 24, Jan. 2, 1912.

MUS. CARLSON, see Sparrman.

MUS. HEINE, see Cabanis and Heine.

MUS. LEVER, see Shaw.

MUS. DE PAYS-BAS, see Schlegel.

NAUMANNIA. Published quarterly.

NITZSCH. *Observ.*, pref. dated Ides, Sept. 1829.

Pterylographie, pref. dated May 20, 1840.

NORTH. The second editions of the *Cat. Birds Austr. Mus.*, *Accipitres* were prepared by North.

Austr. Mus. Cat., No. 2, on the Nests and Eggs of Birds breeding

THE BIRDS OF AUSTRALIA.

in Australia and Tasmania, has the title page dated 1889, but was not published until late in 1890. On p. 398, May 25, 1890, is cited and it was acknowledged in the *Ibis* for Jan. 1891 as received since the October 1890 number was published and was reviewed in the April number.

Two supplements were issued in the *Records of the Austr. Mus.* in March 1891, and April 1892, and these are sometimes found bound up with the original work.

A revised and entirely new edition was published as *Austr. Mus. Special Catalogue*, No. 1, and a collation is here given :

Vol. I.	pt. I.	pp. 1-36	pls. A 1 & B I.	issued June 11, 1901
	II.	37-120	pls. B II., III., & IV.	April 25, 1902
	III.	121-201	pls. A 2, 3 & 4	April 27, 1903
	IV.	201-366	pls. A 5-8 & B V.-VII.	July 11, 1904
		Title page and pp. I.-VII.		Oct. 1904
Vol. II.	pt. I.	pp. 1-105	pls. A 9-11 & B VIII. & IX.	Nov. 1, 1906
	II.	106-234	pls. A 12 & B X. & XI.	July 22, 1907
	III.	235-380	pls. A 13 & B XII. & XIII.	Sept. 30, 1909
		Title page and pp. I.-VII.		
Vol. III.	pt. I.	pp. 1-80	pl. A 14	March 7, 1911
	II.	81-176		July 27, 1911
	III.	177-248	pls. B XIV. & XV.	Oct. 31, 1911
	IV.	249-332	pls. A 15 & B XVI.	June 26, 1912
	V.	333-362	pls. A 16 & 17	Sept. 16, 1912
		Title page & and pp. I.-VII.		
Vol. IV.	pt. I.	pp. 1-96	pls. B XVII. & XVIII.	Jan. 22, 1913
	II.	97-200	pls. B XIX.	June 5, 1913
	III.	201-300	pls. A 18 & B XX. & XXII.	Oct. 30, 1913
	IV.	301-411	pls. A 19 & 20	June 22, 1914
	V.	413-472	pls. B XXIII.-XXV.	Dec. 17, 1914
		Title page and pp. I.-VIII.		

The birds of the *Rep. Horn Sci. Exped.*, pt. II., *Zool.*, were published in Feb. 1896.

NOUV. DICT. D'HIST. NAT. Nouv. ed. This is a very important work as Vieillot published many valuable monographs in it. I have given full details of publication in the *Nov. Zool.*, Vol. XVIII., p. 18, 1911, and I might here emphasise that the prospectus stated that three volumes would be published every three months.

The articles were afterwards reprinted in the *Ency. Meth.* (which see),

APPENDICES.

but very little new matter was there added. The first edition was of twenty-four volumes and appeared in 1803-4, but is of no technical interest to ornithologists, as far as has yet been recorded.

It may be again noted that two prints of the new edition exist differing in such little detail that only one item has yet been observed, but curiously that one caused a peculiar complication.

Nov. Zool. A periodical issued in connection with the Tring Museum at irregular intervals, parts being dated.

OKEN. Editor of the *Isis*.

Lehrb. der Naturg. 1816.

Allg. Naturg. 1841.

ORNITH. MONATSBERICHT. A monthly record of Ornithology.

PALLAS. *Spic. Zool.*, in 10 fascicules. Vol. I., pref. Kalend Mai 1767; fasc. 10, 1774; 11, 1776; 14, 1800.

Reise Russ Reichs. Vol. I., 1771, pref. dated April 28th, 1770.

II., 1773, „ „ April 19th, 1772.

III., 1776, „ „ 10 Feb., O.S.

Zoogr. Rosso-Asiat. An extraordinary complication here exists, copies bearing dates 1832 and 1811, while it is now regarded as being issued in 1827.

PERRY. *Arcana*, issued in 21 parts, 4 plates to a part, on the 1st of each month from Jan. 1, 1810, to Sept 1, 1811. Details of contents given in the *Victorian Naturalist*, Vol. XXIX., May 1912, p. 7 *et seq.*

PHILLIP. *Voyage to Botany Bay*, 1789; pref. dated Nov. 2, 1789, but last plate Nov. 26, 1789.

PÔLE SUD. The plates were issued between the years 1843 and 1846, but those dealing with Mammals and Birds only bear vernacular names, save those of Petrel bills, where Latin names are used. The dates of publication are given by Pucheran in the text, p. 16, footnote, and these are correct as the names are quoted in Latin form in Gray's *Genera Birds*, whence probably these names will bear quotation, as instance, under *Tropidorhynchus* in Vol. I. (p. 125), Oct. 1846, Gray has written: "T.—Voy. au Pôle Sud Ois., t. 17, f. 1. Type of *Leptornis*, Hombr. & Jacq. (1845)." The plate bears a vernacular only. *Neochmia* will also date from Gray's *Genera Birds*, Vol. II. (p. 369), ex Hombr. & Jacq., June 1849. Type by orig. desig. *F. phaeton* H. & J.

The text to the Mamm. & Ois. was only issued in 1853 and is generally quoted as by Jacquinet and Pucheran, but I have a copy with

THE BIRDS OF AUSTRALIA.

the original title by Pucheran alone and the text confirms this, the later acknowledgment to Jacquinot being gratuitous.

PROC. LINN. SOC. NEW SOUTH WALES. Published irregularly, the recent parts bearing dates of issue. The dates of the early parts were given the Second Series, Vol. X., p. 533, and the ones most generally referred to are here reproduced.

Vol. I. pt. 1	pp. 1-20	April 27, 1875	Vol. II. pp. 1-122	July 1877
2	21-96	Feb. 1876	123-217	Jan. 1878
3	97-168	July 1876	218-288	May 1878
4	169-282	Feb. 1877	289-401	June 1878
5	283-419	March 1877		
Vol. III.	pp. 1-76	Sept. 1878	Vol. IV. pp. 1-116	June 16, 1879
	77-161	Dec. 1878	117-244	Oct. 6, 1879
	161-305	no date	245-387	Dec. 1, 1879
	306-443	May 1879	388-492	May 1880

PROC. ZOOL. SOC. (LOND.). Began in 1830 and published irregularly, so that part of the volume for 1851 did not appear until 1854. The exact dates of publication of the years from 1830 to 1858 were given by P. L. Sclater in the July 1893 number.

From 1859 to date four numbers per year have been issued fairly regularly as follows: papers read in Jan. and Feb. issued on June 1; March and April on August 1; May and June on October 1; and Nov. and Dec. on April 1 succeeding year.

PUCHERAN. Author of the birds in the *Voy. Pôle Sud*, which see. Also contributed a series of important articles on the types of Cuvier, Vieillot and Lesson in the Paris Museum to the *Rev. Mag. de Zool.* and the *Ann. Mus. Paris*. An invaluable index to these papers was prepared by Hartlaub and published in the *Journ. für Ornith.*, 1855, p. 417.

QUOY & GAIMARD. Authors of birds of *Voyages Uranie & Physicienne* and of *Astrolabe*. Full details have been published by Sherborn & Woodward in the *Annals Mag. Nat. Hist.*, Ser. 7, Vol. VII., April 1901, p. 392, and *id.*, Vol. VIII., October 1901, p. 333.

RAFINESQUE. *Analyse de la Nature*, 1815, see *Auk*, 1909, pp. 52-55.

RAMSAY. Author of *Cat. Austr. Birds*, see *Cat. Austr. Mus.*

Tab. List. Austr. Birds. 1st ed., received in London Dec. 8th, 1888. 2nd ed., 1891.

RANZANI. *Elem. d'Zool.* I have not collated this work, the only reference concerning me, *Solenoglossus*, being in Vol. III., pt. ii., published Oct. 7, 1821.

APPENDICES.

REICHENBACH. Meyer in his *Index zu L. Reichenbach's Ornith. Werken*, 1879, gives dates of publication, but these are not absolutely dependable, apparently only the ones on the title pages.

Richmond (3), p. 615 footnote, queries publication of the *Nat. Syst. Vogel* in 1852, though it bears a Vorwort dated 1 October 1852. It appeared as the 3rd Lief of the *Handb. spec. Ornith.*

Lief I. *Familie Alcedinidæ*, dated Dec. 1, 1851 } Reviewed in the *Journ.*
 II. *Meropinæ* March 1, 1852 } *für Orn.* for Jan. 1853.

The *Avium Syst. Nat.*, showing figures only, needs rejection, as those I have tested are composite or indeterminable.

REICHENOW. Author of *Vogels Afrika* and part author of *Nomencl. Mus. Heine*.

REVUE MAG. DE ZOOL. (Cuv.). This appeared monthly, the part bearing, for instance, the date June, being issued in the first fortnight of July, and so on.

Through inattention to this detail, Hartert recently *corrected* (!) the correct date given in the *Cat. Birds Brit. Mus.*, and perpetrated more confusion than previously existed.

RICHMOND. Has published three Lists of Generic names of birds supplementary to Waterhouse's *Index Generum Avium*. Great care has been taken in arriving at dates of publication, and these constitute the most valuable records yet prepared. They appeared as follows:

- | | | |
|-----|---|---------------|
| (1) | <i>Proc. U.S. Nat. Mus.</i> , Vol. 24 pp. 663-729 | May 2, 1902 |
| (2) | 35 583-655 | Dec. 16, 1908 |
| (3) | 53 565-636 | Aug. 16, 1917 |

RIDGWAY. Water Birds North America in the *Mem. Mus. Comp. Zool. Harvard*, Vol. XIII. Introd. dated March 31, 1884.

Author of *Birds North America* now being issued.

ROTHSCHILD. <i>Avifauna of Laysan</i> . Pt. 1 pp. 1- 58	August 1893
2 59-126	November 1893
3 127 to end	December 1900

Extinct Birds published in one volume, 1907.

Nov. Zool. Journal published at the Tring Museum under the editorship of Rothschild, Hartert and Jordan.

Monographed the family *Paradiseidæ* in *Das Tierreich*.

SALVADORI. Author of *Ornith. Papuasie e Molluchie* in 3 Vols. and a Supplement. Vol. I. pref. dated June 15, 1879. Vol. II. preface dated May 1881. Vol. III. pref. dated Dec. 1882. The *Aggiunte* was published

THE BIRDS OF AUSTRALIA.

in the *Mem. real Accad. Sci. Torino* in three parts and reprinted with continuous pagination.

Pt. I.	pp. 1-64 in Ser. II. Vol. XL.	pp. 1-64	Published Aug. 21, 1889
II.	67-167	193-293	March 26, 1890
III.	171-244	XLII. 45-118	July 30, 1891

Wrote the monographs on Parrots, Pigeons, Ducks, Tinamous, etc., in the *Cat. Birds Brit. Mus.*, which see.

SALVIN. Famous specialist on Neotropical birds, but wrote the Monograph on the Petrels in the *Cat. Birds Brit. Mus.*, which see.

SAUNDERS. Authority on British Birds, but wrote Monograph on Gulls and Terns in the *Cat. Birds Brit. Mus.*, which see.

SAVIGNY. *Descr. de l'Egypte*. Published in 1809. See Sherborn, *Proc. Zool. Soc. (Lond.)*, 1897, p. 285. Explanation to plates not issued until 1826, when they were edited by Audouin.

SCHLEGEL. *Mus. de Pays-Bas*. Published in monographs which bear dates as follows:

Mon.			Mon.		
1	Buceros	August 1862	21	Pelecani	July 1863
2	Falcones	August	22	Procellariæ	July
3	Aquilæ	September	23	Lari	August
4	Astures	September	24	Sternæ	September
5	Asturinae	September	25	Cuculi	July 1864
6	Buteones	August	26	Psittaci	August
7	Milvi	October	27	Scolopaces	November
8	Pernes	November	28	Ciconiæ	December
9	Polybori	November	29	Cursores	March 1865
10	Vultures	November	30	Ralli	April
11	Oti	December	31	Anseres	May 1866
12	Striges	December	32	Coraces	February 1867
13	Circi	December	33	Urinatores	April
	Résumé general		34	Struthiones	March 1873
	Aves rapaces	December 31	35	Columbæ	March
14	Pitta	January 1863	36	Revue Oiseaux	
15	Buccones	January		de Proie	July
16	Ardeæ	April	37	Revue Pitta	April 1874
17	Alcedines	May	38	Revue Psittaci	May
18	Merops	June	39	Revue Alcedines	June
19	Momotus	July	40	Simiæ	March 1876
20	Ibis	July	41	Tinami	March 1880

APPENDICES.

These are usually bound in eight volumes, according to the title pages in an extraordinary manner, as follows :

Vol. I. including Mons. 1, 15, 25 and 32. Vol. II. including Mons. 11, 12, 2, 13, 4, 5, 6, 3, 7, 8, 9, 10, Résumé general Aves rapaces and 36. Vol. III. including Mons. 26, 38, 18, 19, 17, 39, 14 and 37. Vol. IV. for Mons. 35, 34 and 29. Vol. V. covers Mons. 27, 30, 28, 16 and 20. Vol. VI. for Mons. 31, 22, 23, 24, 21 and 33. Vol. VII. for 40 = Simiæ and Vol. VIII. for 41 = Tinami.

The reason for this is unknown to me, as Vol. I. is reviewed in the *Ibis* for January 1863, p. 105, as consisting of the first six monographs, and there is a preface included dated Oct. 30, 1862.

SCHRANCK. <i>Fauna Boica</i> , Vol. I.	1798	pref. dated July 20, 1797
	II. 1801	March 12, 1801
	III. 1803	Nov. 8, 1802

SCOPOLI. *Annus Hist. Nat.*, I. 1769; II. 1769; III. 1769; IV. 1770; V. 1772.

Introd. Hist. Nat., 1777.

SELBY. Author of works on British Birds, collaborated with Jardine (which see) in the *Illustrations Ornithology*. Wrote the volume of the *Naturalists' Library* (Jardine) dealing with Pigeons, published May 1835.

SEEBOHM. Famous worker on British Birds, wrote Monograph on Warblers and Thrushes in *Cat. Birds Brit. Mus.* (which see), and Monographs on Thrushes and Plovers.

SHARPE, R. B. Wrote Monograph Kingfishers in 1872-3. Author of half the monographs in the *Catalogue of the Birds in the British Museum* (which see), and a *Handlist Genera Species Birds B.M.*, which, lacking original references, has not taken the place in systematic ornithology which it otherwise would.

Sharpe completed Gould's *Birds of New Guinea* and published other Monographs and numerous papers in the *Ibis*, etc.

Attention must here be called to the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., 1906, wherein Sharpe dealt with the Bird Collections and took the opportunity of reviewing the paintings made by Forster, Ellis, and Watling in that Institution. The Watling drawings all represent Australian birds, and were examined by Latham and became the basis of many species. Hence the review given by Sharpe is a most important contribution, and is here again referred to as it was *not* included in the *Zoological Record* for 1906. Collaborated with Wyatt in Monograph of the Swallows, 1885-1894.

SHAW. *Museum Leverianum*. Published in parts according to dates on

THE BIRDS OF AUSTRALIA.

plates. Vol. I., p. 144, pl. dated July 2, 1792, introduces the new name *Pinguinaria*.

Zool. New Holland. I have given some notes on this in the *Emu*, Vol. XI., pt. I., p. 255, April 1, 1912.

Cimelia Physica. Under this title Miller's plates were republished with text, the latter written by Shaw, who rejected many of Miller's names. Title page, 1796.

Naturalists' Miscellany. Nodder painted the plates and Shaw provided the text for this enterprise, which only concluded with Shaw's death. Two hundred and eighty-seven parts appeared between Aug. 1, 1789 and Aug. 1813. These were bound up in twenty-four volumes. The parts were issued at monthly intervals, each part containing three or four plates; the first seven years the former number, the succeeding the latter. A few small discrepancies occur which are explained in two papers, the first by Sherborn in the *Annals Mag. Nat. Hist.*, Ser. 6, Vol. XV., April 1895, p. 375, and the second by J. A. Allen in the *Bull. Amer. Mus. Nat. Hist.*, Vol. XXXI., p. 11, March 4, 1912. This is a very important publication to Australians, as their most common Birds, Fishes and Mammals, etc., were first described in it. I might observe that Shaw was the Director of Zoology at the British Museum, so that he was a good authority on the subjects.

He also began a *General Zoology*, and was dealing with the birds at the time of his death: the work was completed by Stephens, which see.

SHELLEY. Author of *Birds of Africa*, but wrote Monograph on Cuckoos in *Cat. Birds Brit. Mus.*, which see.

SHERBORN. Compiler of the *Index Animalium*, the most important aid to the systematist yet published. In the preparation of this work published many invaluable notes on publication which have been here quoted. At the British Museum (Natural History) the manuscript for the second part of the *Index* is available, and its value cannot be estimated.

SMITH. *Illus. Zool. South Africa*. Published in parts, 10 pls. to a part. 1st and 2nd Nos. reviewed *Ann. Nat. Hist.*, Oct. 1838; 11 Nos. published by Sept. 1840; 21 Nos. April 1845. The plates are numbered consecutively in classes, thus: Aves, pl. iv. These were sorted out and bound under such headings, so that all trace of issue is lost.

The copy in the British Museum (Natural History) has the dates written on the text to the plates, as follows: pls. 1-17, 1838; 18-39, 1839; 40-63, 1840; 64-69, 1841; 70-74, 1842; 75-91, 1843; 92-98, 1844; 99-105, 1845; 106-107, 1846; 108-113, 1847; and 114, 1848. See *P.Z.S.*, 1881.

APPENDICES.

SPARRMAN.	<i>Mus. Carlson.</i>	Fasc. I.	pls.	I.-XXV.	1786
		II.		XXVI.-L.	1787
		III.		LI.-LXXV.	1788
		IV.		LXXVI.-C.	1789

SOUTH AUSTRALIAN ORNITHOLOGIST. Published quarterly, January,
April, July and October.

Vol. I.	pt. 1	pp.	1 (5)-24	Jan.	1914
	2		1 (5)-20 (19)	April	1914
	3		1 (5)-22 (21)	July	1914
	4		1 (5)-32 (31)	Oct.	1914
Vol. II.	pt. 1		1 (5)-24 (23)	Jan.	1915
	2		25 (29)-48	April	1915
	3		49 (53)-76	July	1915
	4		77 (81)-102 (101)	Oct. 1,	1915
	5		103 (109)-126	Jan. 1,	1916
	6		127 (131)-154 (158)	April 1,	1916
	7		159 (163)-187 (190)	July 1,	1916
	8		191 (195)-213 (214)	Oct. 1,	1916

And continued four times a year, on the 1st of January, April, July and October.

STEJNEGER. *Standard Natural History* (Kingsley), Vol. IV., Birds, 1885, by Stejneger, with articles by Barrows, Elliot and Kingsley.

STEPHENS. Continued the *General Zoology* after Shaw's death. The dates of publication of these volumes is important as so many new names are proposed.

Vol. IX. in two parts between July 1816 and March 1817.

X. Titles of both 1817.

XI. *Quart. Journ. Sci.*, No. XV., p. 2, Oct. 1819.

XII. ready *Gentleman's Mag.*, Jan. 1825. Titles 1824.

XIII. Pts. I. and II. acknowledged Linn. Soc., March 26, 1826. Title 1825 ; sub-title 1826. Noted in Froriep's *Notizen* No. 286 April 1826.

XIV. Pts. I. and II. acknowledged Linn. Soc., Feb. 6, 1827. Titles 1826.

SUNDEVALL. *Tentamen*. This was published in two parts. The preface is dated Jan. 1, 1872, but delay took place and the first part did not come out until Aug. 1872, when it was reviewed in the *Ibis*, Oct. 1872. The second part was reviewed in the *Ibis*, July 1873. The first included Introd. pp. i.-xlviii. and pp. 1-72, and the second Introd. pp. xlix. to end, pp. 73 to end.

THE BIRDS OF AUSTRALIA.

An English translation by F. Nicholson was published in 1889, the preface being dated Aug. 1, 1889.

SWAINSON. *Zool. Illustr.* Two series were issued with an interval of seven years. The first from 1820–22 in monthly parts, the plates 6 to a part, numbered, seems to have regularly appeared; pt. 4, Jan. 1, 1821. The second was also intended to appear monthly, but it became irregular towards the end. I have made some comments in the *Nov. Zool.*, Vol. XVIII., p. 12, 1911, and I have not anything much more definite to add.

Fauna Boreali-Americani. Vol. II., with the title page 1831, did not appear until Feb. 1832, *fide* C. W. Richmond.

Classif. Birds. Pt. I., Oct. 1, 1836; pt. II., July 1, 1837.

Birds W. Africa. Vol. I., March 8, 1837; pt. II., Sept. 23, 1837.

Anim. in Menag. Dec. 1837.

Family Flycatchers. May 19, 1838, in *Naturalists' Library*.

TCHIHATCHEFF. *Voy. Sci. d'Altai Or.* Pt. I. acknowledged *B.F.*, Sept. 21, 1844; pt. II., *B.F.*, May 3, 1845. The latter includes a catalogue of birds by Brandt, who introduced new names.

TEMMINCK. *Cat. Syst. Cab. Ornith.*, 1807.

Manuel. 1st ed., 1815, pref. dated 1814.

Manuel. 2nd ed. Vols. I. and II. acknowledged *B.F.*, Oct. 21, 1820; Vol. III., April 18, 1835; and Vol. IV., Dec. 7, 1839.

Les Pigeons, by Knip, dated on title page 1811, appeared in 15 livraisons from 1807 to 1811.

Pigeons and Gallinaces. Vol. I., title 1813, acknowledged *B.F.*, June 11, 1813; Vol. II., 1813; Vol. III., 1815.

TEMMINCK & SCHLEGEL. The Aves in Siebold's *Fauna Japonica* were written up by these authors, and Sherborn gave the dates in the *Proc. Zool. Soc. (Lond.)*, 1895, p. 149. These are here reprinted as a basis for further research.

Pt. I.	pp. 1–28.	1844.	Noticed <i>Wieg. Arch.</i> , 1845, II., p. 47
II. & III.	29–60.	1847.	1847, II., p. 7
IV.–VIII.	61–100.	1848.	1849, II., p. 38
IX.–XI.	101–124.	1849.	1850, II., p. 49
XII.	125–142.	1850.	1851, II., p. 42

TEMMINCK & LAUGIER. *Planch. Color d'Oiseaux.* In the *Ibis*, 1898, Oct., p. 485, Sherborn gave details of publication drawn up from external sources. Since that date the British Museum (Natural History) acquired, through Mr. Sherborn's initiative, a copy of the *Bibliographie de la France*,

APPENDICES.

and I find therein exact data of receipt of these parts. I give these as being of value, confirming Sherborn's results for Vol. I. 2nd edition given below.

Livr. received <i>B.F.</i>		Livr. received <i>B.F.</i>	
1	} With livr. 53 Dec. 25, 1824	38	Sept. 27, 1823
2		39	Oct. 25, 1823 (10 pls. only)
3		40	Dec. 6, 1823
4		41	Dec. 27, 1823 (4 pls. only)
5		42	With 55. 26 Feb., 1825
6		43	Feb. 28, 1824
7	} With 23 to 35 July 26, 1823	44	March 27
8		45	May 1
9		46	May 22
10		47	June 26
11	With livr. 37.	48	July 31
12	38.	49	Aug. 28
13	39.	50	Oct. 2.
14	40.	51	Oct. 23
15	43.	52	Nov. 27
16	44.	53	Dec. 25, 1824
17	45.	54	Feb. 12, 1825
18	46.	55	Feb. 26
19	} 47.	56	April 16
20		57	April 23
21	} With 36 livr. Aug. 2, 1823	58	May 28
22		59	June 25
23	}	60	July 23
24		61	Aug. 27
25		62	Sept. 24
26		63	Nov. 12
27	} Has only 5 pls. July 26, 1823	(63) 64	Dec. 21
28		65	May 27, 1826
29		66	June 10
30		67	July 12
31		68	Sept. 16
32		69	Oct. 28
33		70	Dec. 27
34		71	Feb. 28, 1827
35		72	April 25
36		73	June 30
37	Aug. 2, 1823 Aug. 30, 1823	74	Sept. 22

THE BIRDS OF AUSTRALIA.

Livr.	received <i>B.F.</i>	Livr.	received <i>B.F.</i>
75	Jan. 5, 1828	89	Feb. 11, 1832
76	March 1	90	July 28, 1832
77	April 23	91	Dec. 29, 1832
78	July 5, 1828	92	July 26, 1834
79	Aug. 1, 1829	93	
80	Sept. 5	94	
81	Missing	95	
82	Jan. 2, 1830	96	
83 (73)	Feb. 20	97	
84 (74)	May 8	98	
85	July 3	99	
86	Sept. 4	100	
87	Jan. 22, 1831	101	
88	May 14, 1831	102 & last	June 29, 1839

As further confirmation may be noted that in Froriep's *Notizen*, No. 2, July, 1821, hefts 1-8, and 8 pls. are recorded: in No. 53, Oct. 1822 hefts 9-23, pls. 49-138 are noticed, and in No. 102, Oct. 1823, that the 38th heft was published.

It will be seen from the above that a second edition of the early numbers was printed and delivered with the later livraisons. This accounts for some discrepancies in dates, which had better be here explained. Sherborn showed that the first twenty livraisons contained plates *only*, no text was issued, and that the text for these twenty was issued with the twenty-first. The copy in the British Museum (Natural History) in the Tweeddale Library has at the bottom of the first page of each livraison a date written in ink. These dates generally coincide with those given by Sherborn, but the date of the month also commonly appears. In some cases these dates differ considerably, and we now have the cause. Thus, the plate 100 in the 17th livr. is dated May 1, 1824, but plate 100 was included in the 17th livraison, which was issued in Dec. 1821, while the text was given with the 21st livraison, which appeared in April 1822.

From the above table we see that livr. 17, text and plate, was acknowledged in the *B.F.*, May 1, 1824, exactly the same date. As Froriep acknowledged the livraisons, it is obvious that here we have a second sending out of the earlier livraisons, and these appeared erratically as shown. The receipt of the livraisons from livraison 35 to 92 is very regular, only 42 and 81 being out of order, the latter altogether omitted. Curiously enough receipt of livraisons 93 to 101 do not appear, though the

APPENDICES.

last livraison is given. In two or three instances I noted that 4 plates only were issued, instead of six.

As regards binding, some copies are bound with the livraisons in the order they appeared, while others are bound in systematic order, the livraisons having been broken up. Consequently we get varied quotations, and recriminations, such as appeared in the *Nov. Zool.*, Vol. XXV., p. 315, 1918, where Rothschild and Hartert wrote: "Temminck, *Pl. Col. Ois.*, livr. 72 (not 70 as Mathews quotes, and in Vol. III., not IV. !) pl. 430, 1827." The page referred to is included in Vol. IV. and livraison 70 in the British Museum and in my copy, though both are bound differently, and apparently also different from the one at Tring. According to the number of the plate it should have been included in the 72nd livraison, as my critics give. Probably more discrepancies will appear later, but the source of most is now seen from the preceding account.

TRANS. LINN. SOC. LOND. Only a few dates concern us, but I here give the years as provided by the Linn. Soc.'s record from Mr. C. D. Sherborn's Manuscript, to whom thanks are again rendered.

Vol. 1	1791	Vol. 15 pt. 1 p. 1-334	1826
2	1794	2 335+	1827
3	1797	16 pt. 1 p. 1-150	1829
4	1798	2 151-454	1830
5	1800	3 455+	1833
6	1802	17 pt. 1 p. 1-146	1834
7	1804	2 147-314	1835
8	1807	3 315-464	1836
9	1808	4 465+	1837
10 pt. 1 p. 1-228	1810	18 pt. 1 p. 1-132	1838
2 229+	1811	2 133-246	1839
11 pt. 1 p. 1-178	1813	3 247-482	1840
2 179+	1815	4 483+	1841
12 pt. 1 p. 1-290	1817	19 pt. 1 p. 1-80	1842
2 291+	1819	2 81-170	1843
13 pt. 1 p. 1-276	1821	3 171-302	1844
2 277+	1822	4 303+	1845
14 pt. 1 p. 1-170	1823	20 pt. 1 p. 1-162	1846
2 171-394	1824	2 163-358	1847
3 395+	1825	3 359+	1851

Vol. 15, pt. 1, is the number including Vigors and Horsfield's Essay on Australian birds, and if it appeared in 1826 it must have been December,

THE BIRDS OF AUSTRALIA.

but all the indirect evidence points to early 1827. It was noted in Jardine and Selby's *Illus. Ornith.*, pt. 1., issued Feb. 1827.

Confirmatory evidence is cited in connection with pt. 2, which was noted by Froriep's *Notizen*, No. 422 (XX. 4), Feb. 1828.

[TUNSTALL]. *Ornith. Britannica*, dated 1771. No author's name occurs on this work.

VIEILLOT. *Analyse nouv. Ornith.*, acknowledged *B.F.*, April 14, 1816.

See *Ency. Meth.*

See *Galerie des Oiseaux*.

See *Nouv. Dict. d'Hist. Nat.*, nouv. ed.

VIGORS. Editor of *Zool. Journal*. Co-author with Horsfield of Essay on Australian Birds in Linnean Society.

VROEG. A large history has grown up around this work since Sherborn and Richmond developed it in the *Smithsonian Miscell. Coll.* (Qtly. Issue), Vol. 47, Jan. 31, 1905, p. 332-347. Witmer Stone, Hartert, Van Oort and myself have all had notes on the subject, without much innovation. As the collection was to be disposed of on or before Sept. 22, 1764, that date indicates when it was published.

WAGLER. *Syst. Avium*, reviewed *Isis*, Oct. 1827, and *Zool. Journ.*, Dec. 1827. Monograph of Parrots in the *Abhandl. Ak. Wissen Munchen*, Vol. I., 1832, after Dec. Separates dated 1835.

WATERHOUSE. *Index Generum Avium*. Preface dated Aug. 1, 1889. A valuable list, but no care for dates of publication was at that time taken.

WHITE. *Journ. Voy. N.S.W.* Title page dated 1790, but latest date on plates, Dec. 29, 1789.

Two issues of this work are in existence, as in the earliest the Wattled Bee-eater or *Merops* is given, while in the latter the name *Merops carunculatus* appears (p. 240). I have seen no other differences. Reviewed in *Gent. Mag.*, Vol. LX., pt. II., p. 742, Aug. (31) 1790.

WILSON. *Illus. Zool.* Published in parts, each 4 pls., 9 Nos. altogether, 35 pls. in all. Pref. dated April 25, 1827. No. 1 reviewed *Edinb. New Philos. Journ.*, April-July 1827, p. 199; No. 2, *ibid.*, July-Sept. p. 397; No. 3, *ibid.*, Jan.-March 1828, p. 411. Four parts were out in June 1828; the seventh part before Nov. 1829, and eighth and ninth parts in May 1831.

APPENDICES.

ZOOL. JOURN. At first issued fairly regularly, but before cessation its appearance became erratic.

		On List Contents.	Title page.	True date of publication.
Vol. I.	pt. 1	March 1824	March 1824	March 1824
	2	June	June	June
	3	Oct.	Oct.	Oct.
	4	Jan. 1825	Jan. 1825	Jan. 1825
II.	pt. 5	April	April	April.
	6	July	July	July
	7	Oct.	Oct.	Oct.
	8	Jan-April 1826	Jan. 1826	April 1826
III.	pt. 9	Jan. 1827	Jan. 1827	July 1, 1827
	10	April-Sept.	April-July	Sept.
	11	Sept.-Dec. 31	Aug.-Nov.	Dec. 31
	12	Jan.-April 1828	Jan.-April 1828	April 1828
IV.	pt. 13	April-July	—	July
	14	July-Oct.	—	Oct.
	15	Oct. 1828-Jan. 1829	—	Jan. 1829
	16	Jan.-May 1829	—	May 1829
V.	pt. 17	May 1829-Feb. 1830	—	Feb. 1830
	18	Feb.-June	—	June 1830
	19	July 1830-Sept. 1831	—	July 1832
	20	1832-1834	—	Dec. 5, 1835

Earlier volumes edited by Broderip and Sowerby, later by Vigors. I have a note that No. 14 was reviewed in March 1829, which suggests that some of the above dates need confirmation.

ZOOL. MISCELLANY, see Leach, see Gray.

ADDENDA TO APPENDIX B.

I SENT a proof of this to my friend Dr. C. W. Richmond for advice and emendations, and I have now received same, and as these corrections are of much import I herewith add them, while recording my very best thanks for Dr. Richmond's assistance. The headings are the same as in the Appendix, and all these notes are in Dr. Richmond's own words:—

BONAPARTE. *Comp. List Birds Europe and America.* "Please don't make me say 'Jan.' It is advertised in the *Athenæum* and in *Lit. Gazette* for April 14, 1838."

THE BIRDS OF AUSTRALIA.

BRANDT. *Descr. Icon. Anim. Russ.* "Refer to Finsch, *Abh. Nat. Ver.*, Bremen, III., pp. 19-21."

BULLER. *Essay New Zealand Ornith.* "Reprinted in *Trans. N.Z. Inst.*, Vol. I., 1869. Vol. I. of the *Trans.* exists in 2 editions. In ed. 1 the *Essay* is separately paged; in ed. 2 it is paged consecutively with the *Trans.*"

CATALOGUE OF THE BIRDS IN THE BRITISH MUSEUM. "For the 'most important' work it ought to be possible to give nearly exact dates of publication. These preface dates are *not* dates of publication. In several of the vols. (2, 6, 20, 25) it is likely that actual publ. dates from the next year. The Smithsonian copies were received Vol. 2, April 26, 1876; Vol. 6, March 28, 1882; Vol. 20, May 9, 1892; and Vol. 25, April 14, 1896." [At this date, owing to war conditions, exactitude in this matter cannot be obtained, but will attempt at the first opportunity. The prefaces *were signed* for *exact* date of publication, but delays in some instances may have occurred.—G.M.M.]

CUVIER. *Tabl. Elém.* "In list of new books, in *Journ. Typogr.* for Dec. 24, 1797. *Leçons d'Anat. Comp.* in same place for April 19, 1800."

DAUDIN. *Traité d'Orn.* "See Richmond, *Auk*, Oct. 1899, p. 325 note. *Journ. Typogr.* announces Vol. 2 on 25th Floreal, an 8=May 14, 1800."

DIEFFENBACH. *Travels in New Zealand.* "Said to have been published about middle of Jan. 1843."

DUMERIL. *Anal. Zool.* "Dated 1806, but in list of new books in *Journ. Typogr.* for Nov. 14, 1805, and reviewed in detail in same place, Dec. 6, 1806."

EYTON. *Hist. Rarer Brit. Birds.* "Wood, *Orn. Text Book*, May 1836, 191, says Pt. 1, 'Jan. 1836,' closes with cuts of Black Stork and *Tringa temmincki*, and that 2 more *monthly* numbers will complete it. Pt. 1 is reviewed in Loudon's *Mag.* for Feb. 1836; Pts. 2 and 3 are reviewed in the same for May 1836."

FINSCH, OTTO. *Die Papageien.* Vol. I. Title 1867. Reviewed August.
Vol. II., in two parts. Pref. August 8th, 1868.

FLEMING. *Philosophy Zoology.* "In list of new books for Feb.-June in *Edinb. Review* (June 1822, p. 280). In list of new books in *Thompson's Annals Philos.* for July 1822. In list new books in *Blackwood's Mag.* for June 1822."

GLOGER. *Hand. und Hilfsb.* "Heft III.-v, 1841, 8, s. 161-400 [= Pts. 3-5, 1841, 8vo, pp. 161-400] are reviewed in *Isis*, 1842, 394-395. Heft 6 *probably* extended to p. 480, beginning the reptiles. Then something happened, and he gave up the project, but issued Heft 7, which contains a

APPENDICES.

substitute p. 477, and index, also the preliminary pages ; this last Heft, issued (presumably) in 1842, as indicated by title page date."

GOULD. *Handb. Birds Austr.* "Vol. I. is advertised as published 'this day' on an advertisement at back of some other book ; the advert. was dated *Sept. 1, 1865*. From this I judge the 2 vols. were not issued together."

GRAY. *Cat. Gen. Subgen. Birds.* "In list of papers received by *Journ. f. Orn.* for July 1855, p. 352." [I don't know when this was published.—G.M.M.]

GRIFFITH. *English ed. Cuvier's Animal Kingdom.* "There were to be about 9 parts on birds beginning with 'Pt. 14, commencing the Class Aves.' advertised in *Lit. Gazette*, Dec. 1, 1827, 784. Pt. 15 in same place, March 29, 1828, to be published on March 31. Pt. 16 was published Aug. 6, 1828, see *Athenæum* of that date: this contained 18 engravings of birds. Pt. 19 was published May 21, 1829, see *Athenæum* advert. Pt. 20 (with 16 engravings) advt. in *Lit. Gazette* for Aug. 15, 1829. Pt. 21 (with 21 engravings) same place, Oct. 31, 1829. The 3 vols. birds are listed in new books list in *Lit. Gazette* for Jan. 23, 1830."

HORSFIELD (p. 454). *Zool. Res. in Java*, in 8 parts. Pt. 1, July 1821 ; 2, Nov. 1821 ; 3, Feb. 1822 ; 4, June 1822 ; 5, Oct. 1822 ; 6, April 1823 ; 7, Oct. 1823 ; 8, April 1824. Contents of parts are given in the instructions to binder at the end of the preface. The dates on the plates are about right.

IBIS. "Suppl. No. for 1873 issued in Feb. 1874."

JARDINE. *Illus. Ornith.* "No. 1 advt. as just published, *Athenæum*, Feb. 11, 1837. No. 2 same journal, May 27, 1837. No. 3 published Dec. 1, 1837. No. 4 same journal, June 30, 1838. No. 5 same journal, March 23, 1839. No. 6 same journal, Feb. 22, 1840. No. 7 same journal, July 25, 1840. No. 9 adv. as ready *Publ. Circular*, June 15, 1843."

JOURN. FUR ORN. On front cover of Jan. No. for 1862 is printed : "N.B. Das 6 Heft des IX. Jahrganges erscheint in aller Kurze. Ausgegeben am 17 Marz, 1862." No. for March 1862. Received by Smithsonian, June 7, 1862. Last Heft for 1862 has notice printed at bottom of front cover : "Das Januar Heft des folgenden Jahrganges ist bereits früher ausgegeben." No. for Jan. 1864, has printed on front cover : "Das Schluss (November) Heft des Jahrg. 1863 wird baldigst nachgeliefert werden." Cover for Heft VI. (for Nov. 1864) has the following note : "Heft I. u. II. des Jahrg. 1865 sind bereits ausgegeben." Heft I. for 1864 has at bottom of front cover : "Das Schluss (November) Heft des Jahrg. 1864 wird baldigst nachgeliefert werden." Heft II. for March 1865 has on cover : Das Schluss Heft des Jahrgange 1864 wird

THE BIRDS OF AUSTRALIA.

in 14 Tagen nachgeliefert werden." On cover for Jan. 1866 Heft is found: "Das Schluss (November) Heft des Jahrg. 1865 wird baldigst nachgeliefert werden." The cover for Nov. 1866 has *stamped* (not in regular printer's impression) on inside a notice saying: "Heft 1. de 1867 ist Erschienen Ende Januar 67. Das 2 Heft ist im Druck!" Last Heft for 1867 has printed on front cover: "Auf die Anzeigen am Schlusse des Heftes wird verwiesen." Heft for Jan. 1871 has note printed at bottom: "Bitte : die Einladung auf S. 71 ff. nicht zu überschen. Das Schluss Heft 1869 wird baldigst nachfolgen." On cover for Jan. 1871 we find: "Das Schluss Heft 1870 wird baldigst nachgeliefert."

Nature, Aug. 10, 1876, 309, says the *J.f.O.* is "always several months in arrears." No. for July 1876 not issued till Jan. 1877 (see *Ibis*, 1877, 239, note). Heft 3 for 1879 "wird im Laufe des Monats ausgegeben" (*Orn. Centralblatt*, Jan. 15, 1880, 16). Heft 2, 1880, publ. Oct. (cf. *J.f.O.*, 1882, 452-3). Heft 3, 1880, publ. Dec. (cf. *J.f.O.*, 1882, 458). April 1890 Heft not issued till Oct. (cf. Hartert, *Novit. Zool.*, II., 487). Dates of issue for 1887-90 (see *Ibis*, 1891, 616).

KAUP, *Class. Saugeth. u. Vogel*. "Noted in the *Intell. Blatt.* of 'Serapeum' for March 15, 1844."

LATHAM. *Index Ornith.* "presented to Philos. Soc., London, Dec. 9, 1790."

MACGILLIVRAY. *Rapacious Birds Great Britain*. "In list of new books, Jan. 16, 1836, p. 49."

Manual Land Birds. Same place, Nov. 28, 1840.

Manual Water Birds. Same place, May 28, 1842."

SCHLEGEL. *Mus. de Pays-Bas*. "Really issued in livraisons of several monographs." [I find this to be correct, and as exact dates are unknown at the present time, must delay correction until definite dates can be provided, which will be put forward at the earliest opportunity. Dr. Richmond has forwarded contents of livraisons and observed that there is nothing extraordinary in the matter of binding, as it is according to classification. My only comment is that the classification must be termed "extraordinary."—G.M.M.]

SELBY. *Naturalists' Library, Pigeons*. "Both *Athenæum* and *Literary Gazette* of Aug. 1, 1835, give it in list of new books, and an advert. says 'just published.'"

SHAW. *Museum Leverianum*. "No. 1 presented to Roy. Soc., Jan. 12, 1792; No. 2, May 3, 1792; Nos. 3 and 4, Nov. 22, 1792; and No. 5, Feb. 14, 1793." "5 Parts (65 pls.). Reviewed in *Monthly Review*, Jan. 1795, 47. Begun in 1792. Pt. 6, 12 pls. and text 1796."

APPENDICES.

SMITH. *Illus. Zool. South Africa*. "See Waterhouse, *Proc. Zool. Soc. (Lond.)*, 1880, p. 489, for full details." Not 1881 as stated on p. 466.

TEMMINCK. *Manuel* 1st edition. "Dr. J. Dwight, N.Y., has a copy with two title pages, one '1814' and the other '1815.'" *Les Pigeons*. "See Coues, *Orn. Bibl.*, pt. 3, pp. 794-797, for important data on this work."

TEMMINCK & LAUGIER. *Planch. Color d'Oiseaux*. Livr. 93 and 94, "1835," Livr. 96, 97, 98 "1836" according to Wiegmann's *Archiv*. "There appears to be a late re-issue about 1850, but I have not seen the work."

TRANS. LINN. SOC., LOND. "Vol. I. presented to Roy. Soc. Nov. 24, 1791; Vol. 4, May 24, 1798; Vol. 5, Feb. 20, 1800; Vol. 6, June 5, 1802"; Vol. 12, pt. 2 "about July 1819."

Vol. XV., pt. I. "*Literary Gazette* for Feb. 17, 1827, 112, has advert. saying 'This day is published,' and it was received by Geol. Soc. Lond. on March 2, 1827."

INDEX.

NOTE.—The cyphers in **THICK TYPE** refer to the pages where the genus or species is systematically treated. These are placed first.

- Acanthiza*, 127.
 — *apicalis*, 359.
 — *chrysorrhoea*, 359.
 — *ewingii*, 345, 359.
 — *inornata*, 359.
 — *lineata*, 345, 359.
 — *nana*, 318, 345, 359.
 — *pusilla*, 307, 317, 325, 345, 359, 400.
 — *uropygialis*, 345.
Acanthogenys rufogularis, 307.
Acanthorhynchus superciliosus, 345.
 — *tenuirostris*, 307, 345, 359.
Acanthornis magnus, 359.
Acanthura, 264.
Acanthylis, 261, 264.
 — *caudacuta*, 269, 277.
 — *ciris*, 270.
 — *leucopygialis*, 265.
 — *sylvatica*, 265, 266.
Acanthyllis, 269.
Acanthyllops, 267, 268.
Achantylops, 267.
Actenoides, 143, 144, 148, 159, 161.
 — *hombroni*, 158.
 — *jacquinoti*, 170.
 — *moseleyi*, 158.
Ægintha temporalis, 345, 359.
Ægotheles, 1, 2, 67.
 — *affinis*, 64.
 — *albertisi*, 64.
 — *australis*, 54.
 — *bennetti*, 51, 63, 65, 67.
 — *crinifrons*, 51, 52.
 — *cristata*, 53, 51, 65.
 — — *bennetti*, 65, 67.
 — — *centralia*, 67.
 — — *cristata*, 54, 64.
 — — *leucogaster*, 54, 64, 65.
 — — *melvillensis*, 67.
 — — *murchisoniana*, 54, 64, 66.
 — — *olivei*, 65.
 — — *rufa*, 54, 64, 66.
 — — *tasmanica*, 67.
 — *cristatus*, 54.
 — *dubius*, 64.
 — *insignis*, 51.
 — *leucogaster*, 54, 62, 63, 65.
Ægotheles lunulata, 54.
 — *novæhollandiæ*, 53, 57, 58, 62, 63, 65.
 — — *novæhollandiæ*, 63.
 — *psilopterus*, 51, 52.
 — *pulchra*, 51.
 — *rufa*, 54, 62, 63, 66.
 — *rufescens*, 54, 62, 63.
 — *salvadorii*, 51, 64.
 — *savesi*, 68.
 — *wallacei*, 51.
ænigma, *Halcyon*, 195.
Aerodramus, 246, 259.
aerophila, *Collocalia*, 258.
 — — *fuciphaga*, 257.
Aerornis, 267, 268.
Æstrelata scalaris, 425.
affinis, *Ægotheles*, 64.
 —, *Alcyon*, 82, 94.
 —, — *azurea*, 91, 94.
 —, *Melithreptus*, 307, 345.
Agreutes, 115, 116.
albani, *Cacomantis rubricatus*, 313.
 —, *Cuculus rubricatus*, 313, 320.
Albatross, *Snowy*, 427.
alberti, *Harriwhitea*, 409, 408.
 —, — *alberti*, 409, 412.
 —, *Menura*, 409, 411.
albertisi, *Ægotheles*, 64.
albifrons, *Epthianura*, 307, 318, 345, 359.
 —, *Gliciphila*, 345.
albigularis, *Caprimulgus*, 231, 232.
 —, *Eurostopodus*, 221, 231.
albimaculatus, *Caprimulgus*, 221.
albiscapa, *Rhipidura*, 300.
albiventris, *Alcedo*, 150, 160.
albogularis, *Caprimulgus*, 221, 222, 232.
 —, *Eurostopodus*, 224, 232.
albonotata, *Halcyon*, 154.
albonotatus, *Caprimulgus*, 238.
 —, — *macrurus*, 239.
 —, *Rossornis macrurus*, 243.
albostrigatus, *Cuculus*, 293, 295.
Alcedo, 80, 82, 97, 98, 143.
 — *albiventris*, 150, 160.
 — *alcyon*, 142.
 — *australasia*, 153, 154.
 — *azurea*, 84, 90.

THE BIRDS OF AUSTRALIA.

- Alcedo chelicuti*, 149, 160.
 — *collaris*, 142.
 — *coromanda*, 142, 151.
 — *cyaneiventris*, 152, 153, 160, 162.
 — *dea*, 198, 199.
 — *fusca*, 118.
 — *gigantea*, 118.
 — *gigas*, 118.
 — *gularis*, 152, 160.
 — *ispida*, 81, 87, 142.
 — *madagascariensis*, 97.
 — *natalensis*, 97.
 — *pileata*, 153, 160.
 — *sacra*, 142, 182.
 — *senegalensis*, 142, 151.
 — *smyrnensis*, 152, 153, 160.
 — *tribrachys*, 84, 90.
 — *tridactyla*, 84.
 — *tuta*, 157.
 — *undulata*, 118.
 — *venerata*, 157.
Alcyon, 143.
 — *alcedo*, 142.
 — *sanctus*, 181.
Alcyone, 79, 80, 82, 83, 95, 96, 97, 99, 166.
 — *affinis*, 83, 94.
 — *alisteri*, 84.
 — *assimilis*, 103.
 — *australis*, 84.
 — *azurea*, 84, 82, 83, 87, 88, 90, 91, 94, 101.
 — — *affinis*, 91, 94.
 — — *alisteri*, 85.
 — — *azurea*, 85, 91.
 — — *diemenensis*, 85.
 — — *distincta*, 94.
 — — *lessoni*, 91, 94.
 — — *mixta*, 85.
 — — *pulchra*, 85, 91.
 — — *victoriæ*, 85.
 — — *wallaceana*, 94.
 — — *yamdenæ*, 94.
 — *cyanipectus*, 82, 99.
 — *diemenensis*, 85, 87, 88, 90.
 — *diemensis*, 85.
 — *lessoni*, 83, 94.
 — *pulchra*, 83, 85, 88, 89, 90, 94.
 — *pusilla*, 82, 83, 100, 101, 102, 103, 104.
 — — *halli*, 100, 102.
 — — *pusilla*, 100, 102.
 — *ramsayi*, 100, 102.
 — *richardsi*, 83, 102, 103, 104.
 — — *aolæ*, 102.
 — — *bougainvillei*, 102.
 — — *richardsi*, 102.
 — *ruficollaris*, 181, 189.
 — *solitaria*, 82.
alecto, *Piezorhynchus*, 325.
alexandræ, *Northipsitta*, 432.
Alisteranus cinctus, 345.
alisteri, *Alcyone*, 84.
alisteri, *Alcyone azurea*, 85.
Alphapuffinus, 422, 423.
Alterapus, 264, 266, 267.
 — *sabini*, 264.
amabilis, *Leggeornis*, 345.
 — *Malurus*, 324, 329.
Amaurodryas vittata, 307, 318, 359.
ambiguus, *Rossornis macrurus*, 243, 245.
amechana, *Collocalia fuciphaga*, 257.
amelis, *Collocalia fuciphaga*, 258.
Amytornis woodwardi, 325.
analoga, *Ptilotis*, 324, 329.
anamesus, *Caprimulgus macrurus*, 239, 245.
annulosa, *Steganopleura*, 433.
 — — *bichenovii*, 434.
 Anomalous Hornbill, 376.
Antrostomus, 235.
antarcticus, *Lopholæmus*, 308.
 — *Lopholaimus*, 415.
Anthochaera chrysoptera, 307.
Anthus australis, 307.
Antisyma, 154, 161.
aolæ, *Alcyone richardsi*, 102.
 — *Micralcyone pusilla*, 104.
Aphelocephala leucopsis, 345.
apiaster, *Merops*, 206, 207.
apicalis, *Acanthiza*, 359.
Aplonis metallicus, 108.
Apos, 275.
Apus, 275.
 — *pacificus*, 276.
 — *Micropus*, 275.
Ardenna, 422.
arfakianus, *Cacomantis castaneiventris*, 330.
argentata, *Argyroceyx*, 97.
 — *Ceyx*, 97.
argenteiceps, *Philemon*, 374.
argus, *Eurostopodus*, 224, 227.
 — — *argus*, 227, 233.
 — *Eurostopus*, 227, 230, 232, 233.
Argyroceyx, 97, 98.
 — *argentata*, 97.
 — — *flumenicola*, 97.
Artamus leucorhynchus, 307.
 — *personatus*, 213.
aruensis, *Rossornis macrurus*, 242, 243.
assimilis, *Alcyone*, 103.
 — *Cuculus*, 325, 326.
 — *Malurus*, 344.
 — *Puffinus*, 422, 424.
Astacophilus, 144, 148.
 — *lindsayi*, 144.
astrolabæ, *Eurostopodus*, 226.
athertoni, *Cacomantis rubricatus*, 313.
 — *Cuculus rubricatus*, 312, 320.
atricapillus, *Melithreptus*, 307, 318.
Atrichia, 392, 393.
atripennis, *Caprimulgus macrurus*, 239.
 — *Rossornis macrurus*, 243.
Aurephthianura aurifrons, 345, 359.

INDEX.

auricularis, *Puffinus*, 423.
aurifrons, *Aureptianura*, 345, 359.
australasia, *Alcedo*, 153, 154.
australasiæ, *Halcyon*, 153.
——, *Todiramphus*, 181.
australasianus, *Meliornis*, 317.
australe, *Choucalcyon*, 116, 143.
australis, *Ægotheles*, 54.
——, *Alcyone*, 84.
——, *Anthus*, 307.
——, *Chætura*, 269, 270.
——, *Conopoderas*, 307, 359.
——, *Cypselus*, 276.
——, *Eopsaltria*, 307, 318, 325, 359.
——, *Eudynamis*, 370.
——, *Eurystomus*, 72, 77.
——, *Lamprococcyx lucidus*, 349, 352.
——, *Micropus*, 276.
——, *Peltohyas*, 212.
——, *Podargus*, 5, 36.
Austrariamus melanops, 307, 359.
Austrodicæum hirundinaceum, 318, 345.
Azure Kingfisher, 84.
azurea, *Alcedo*, 84, 90.
——, *Alcyone*, 84, 82, 83, 87, 88, 90, 91, 94, 101.
——, ——— *azurea*, 85, 91.
——, *Ceyx*, 84, 122.

badia, *Halcyon*, 152, 160.
Banded Goatsucker, 53.
bandi, *Steganopleura bichenovii*, 434.
bannermani, *Puffinus*, 423.
Barnard Kingfisher, 167.
barnardi, *Barnardius*, 58.
——, *Chrysococcyx*, 364, 367.
——, *Cyanalcyon macleayii*, 164, 168, 169, 170.
——, *Halcyon*, 164, 167, 169.
——, ——— *macleayii*, 164, 167.
——, *Lamprococcyx russatus*, 368.
——, *Lazulena macleayii*, 167.
——, *Neochalcites*, 364.
Barnardius barnardi, 58.
basalis, *Chalcites*, 339, 338, 360.
——, *Chalcococcyx*, 324, 339.
——, *Chrysococcyx*, 339.
——, ——— *basalis*, 345.
——, *Cuculus*, 334, 335, 341, 345, 346.
——, *Lamprococcyx*, 339, 343.
——, *Neochalcites*, 323, 339, 358.
basilanica, *Ceyx*, 96.
Batrachostomus, 1, 3, 48, 51, 52.
bayleyi, *Cyphorhina papuensis*, 46.
——, *Megapodargus papuensis*, 46, 50.
——, *Podargus papuensis*, 46.
Bee-eater, 208.
——, *Indian*, 210.
——, *Mountain*, 209.
——, *Variegated*, 208.
Belchera rosea, 325.
belli, *Cuculus optatus*, 287, 290.

bennetti, *Ægotheles*, 51, 63, 65, 67.
——, ——— *cristata*, 65, 67.
——, *Corvus*, 381.
berigora, *Ieracidea*, 66.
bichenovii, *Steganopleura*, 433, 434.
bihagi, *Cacomantis castaneiventris*, 330.
bimaculatus, *Caprimulgus macrurus*, 239, 245.
——, *Rossornis macrurus*, 243.
Black-eared Cuckoo, 332.
Blue-headed Cuckoo, 370.
—— *Kingfisher*, 84.
—— *winged Kingfisher*, 131.
boobook, *Ninox*, 21.
bougainvillei, *Alcyone richardsi*, 102.
——, *Halcyon*, 159.
——, *Micralcyone pusilla*, 104.
bournsi, *Ceyx*, 96.
boweri, *Bowyeria*, 307.
Bowyeria boweri, 307.
Brachypus, 275.
brachypterus, *Podargus*, 7, 19, 28, 29, 30, 31, 36.
——, ——— *strigoides*, 7, 34.
bracteatus, *Dicruropsis*, 307, 374.
bravi, *Eurystomus orientalis*, 71, 77.
Brevipes, 275.
brevirostris, *Collocalia fuciphaga*, 257.
——, *Smicrornis*, 344, 359.
brisbanensis, *Cuculus*, 321.
Broadbentia flava, 307, 325.
Broad-billed Bronze Cuckoo, 349.
Bronze Cuckoo, 354, 284.
Brown Flycatcher, 125.
—— *Kingfisher*, 118.
brunneitorques, *Chætura*, 266.
brunneus, *Pyrrolæmus*, 336.
bubu, *Cuculus*, 287.
bucroides, *Neophilemon*, 307.
bucroides, *Neophilemon*, 374.
byroni, *Reinholdia reinholdi*, 421, 422.

Cacomantis, 282, 284, 285, 292, 305, 311, 331.
—— *castaneiventris*, 311, 324, 328, 329, 330.
—— ——— *arfakianus*, 330.
—— ——— *bihagi*, 330.
—— ——— *castaneiventris*, 328, 330.
—— *cinereus*, 293.
—— *dumetorum*, 321, 325.
—— *flabelliformis*, 312, 319, 323, 324.
—— *flavus*, 311.
—— *incertus*, 312.
—— *inornatus*, 293.
—— *insperatus*, 321, 325.
—— *lineatus*, 321, 326.
—— *pallidus*, 289, 293.
—— *passerinus*, 311.
—— *pyrrhophanus*, 321.
—— ——— *dumetorum*, 326.
—— ——— *lineatus*, 326.
—— ——— *variolosus*, 326.
—— ——— *vidgeni*, 326.

THE BIRDS OF AUSTRALIA.

- Cacomantis pyrrhophanus dumetorum*, 322, 326.
 ——— *variolosus*, 322, 326.
 ——— *westwoodia*, 322, 326.
 ——— *rubricatus*, 312, 313.
 ——— *albani*, 313.
 ——— *athertoni*, 313.
 ——— *eyrei*, 320.
 ——— *rubricatus*, 313.
 ——— *rufulus*, 312.
 ——— *tymbonomus*, 321, 325, 380.
 ——— *variolosus*, 321, 324, 325, 329, 380.
cæruleus, *Halcyon macleayii*, 164, 168, 169.
cajeli, *Ceyx*, 96, 98.
Calamanthus campestris, 307, 359.
 ——— *fuliginosus*, 307, 318, 344.
 ——— *montanellus*, 318.
 ——— *rubiginosus*, 344.
Calealcyon, 143, 144, 148, 151.
Callocalia, 260.
Calonectris, 422.
Campbellornis personatus, 307, 359.
 ——— *superciliosus*, 307.
campestris, *Calamanthus*, 307, 359.
canacorum, *Sauropatis sancta*, 192.
Cancrophaga, 143.
canoroides, *Cuculus*, 287, 288, 289, 290.
canorus, *Cuculus*, 286, 288, 290, 296, 304.
cantor, *Cuculus*, 287.
capensis, *Podargus strigoides*, 35.
capnitis, *Collocalia fuciphaga*, 257.
Caprimulgus, 52, 219, 229, 234, 235.
 ——— *albigularis*, 231.
 ——— *albimaculatus*, 321.
 ——— *albogularis*, 221, 222, 232.
 ——— *albonotatus*, 238.
 ——— *carolinensis*, 235.
 ——— *crassirostris*, 36.
 ——— *cristatus*, 53, 55.
 ——— *europæus*, 234, 235.
 ——— *eximius*, 235.
 ——— *gracilis*, 5, 36.
 ——— *guttatus*, 221, 226, 227, 229, 231, 232.
 ——— *macrurus*, 234, 235, 236, 237, 238, 239, 242.
 ——— *albolaxatus*, 245.
 ——— *albonotatus*, 239.
 ——— *anamesus*, 239, 245.
 ——— *atripennis*, 239.
 ——— *bimaculatus*, 239, 245.
 ——— *keatsi*, 236, 239, 240, 241, 242, 245.
 ——— *kuehni*, 244.
 ——— *macrurus*, 239, 240, 241, 244.
 ——— *meeki*, 244.
 ——— *mesophanis*, 239, 240, 241, 242, 244.
 ——— *nipalensis*, 239.
 ——— *oberholseri*, 244.
 ——— *salvadorii*, 242, 244.
 ——— *yorki*, 236, 238, 239, 240, 241, 244, 245.
 ——— *megacephalus*, 5, 36.
Caprimulgus mystacalis, 221, 232.
 ——— *novæhollandiæ*, 53, 55.
 ——— *podargus*, 5, 36.
 ——— *salvadorii*, 238, 240.
 ——— *schlegelii*, 242, 245.
 ——— *strigoides*, 5, 36.
 ——— *vittatus*, 53, 56.
Carcineutes, 144.
Caridagrus, 144, 148, 159.
 ——— *concretus*, 144, 161.
Caridonax, 116, 117, 144.
 ——— *fulgidus*, 144, 160.
carolinæ, *Tanysiptera*, 198.
carolinensis, *Caprimulgus*, 235.
Carpophaga, 108, 413.
 ——— *lepida*, 414.
 ——— *magnifica*, 108.
carteri, *Chrysococcyx plagosus*, 354, 360.
 ———, *Lamprococcyx plagosus*, 354.
carunculata, *Coleia*, 307.
cassini, *Chætura*, 264.
 ———, *Neafrapus*, 264.
castaneiventris, *Cacomantis*, 311, 324, 328, 329, 330.
 ———, ——— *castaneiventris*, 328, 330.
 ———, *Cuculus*, 328.
 ———, *Vidgenia*, 328, 327.
castanotis, *Tæniopygia*, 345.
caudacuta, *Acanthylis*, 269, 277.
 ———, *Chætura*, 262, 269, 273.
 ———, ——— *caudacuta*, 270.
 ———, *Hirundo*, 269.
 ———, *Pallene*, 269.
caudacutus, *Hirundapus*, 269.
 ———, *Hirundinapus*, 270.
cauta, *Hylacola*, 318, 344.
Cecilia, 153, 160.
centralia, *Ægotheles cristata*, 67.
 ———, *Podargus strigoides*, 34.
Centropodus, 391.
Centropus, 283, 383, 386, 387.
 ——— *gigas*, 384.
 ——— *leucogaster*, 391.
 ——— *macrourus*, 385.
 ——— *melanurus*, 385.
 ——— *phasianinus*, 384, 385.
 ——— ——— *macrourus*, 385.
 ——— ——— *melanurus*, 385.
 ——— ——— *phasianinus*, 385.
 ——— *phasianus*, 381, 384, 389.
 ——— *variegatus*, 384.
cervicalis, *Dacelo*, 132.
cervina, *Dacelo*, 131, 134, 135, 138, 139.
 ———, ——— *leachii*, 132, 139, 140.
 ———, *Paralcyon*, 132.
Ceryle, 81, 99, 143.
Ceycalcyon, 97.
 ——— *cyanopectus*, 97.
 ——— ——— *steerii*, 97.
Ceycoides, 98.

INDEX.

- Ceycoides, madagascariensis*, 98.
Ceycopsis, 80, 98, 99, 160.
Ceyx, 79, 80, 82, 83, 86, 95, 96, 97, 98, 99, 143, 151, 152.
—— *argentata*, 97.
—— *azurea*, 84, 122.
—— *basilanica*, 96.
—— *bournsi*, 96.
—— *cajeli*, 96, 98.
—— *collectoris*, 96.
—— *cyanea*, 84, 90.
—— *cyanipectus*, 83.
—— *cyanopectus*, 97.
—— *dillwynni*, 96.
—— *dispar*, 96.
—— *eucrythra*, 96.
—— *flumenicola*, 97.
—— *gentiana*, 95.
—— *goodfellowi*, 96.
—— *innominata*, 96.
—— *lepida*, 82, 96, 98.
—— *malamaii*, 96.
—— *melanura*, 82, 96.
—— *mindanensis*, 96.
—— *philippensis*, 98.
—— *purpurea*, 82.
—— *pusilla*, 100.
—— *rufidorsa*, 82.
—— *samarensis*, 96.
—— *solitaria*, 83, 95, 99.
—— *steerii*, 97.
—— *tribrachys*, 84.
—— *tridactyla*, 82, 96.
—— *wallacei*, 96.
Ceyxalcyon, 98.
Chætura, 262, 263, 264, 267, 270.
—— *australis*, 269, 270.
—— *brunneitorques*, 266.
—— *cassini*, 264.
—— *caudacuta*, 262, 269, 273.
—— — *caudacuta*, 270.
—— *ciris*, 270.
—— *fusca*, 269.
—— *grandidieri*, 246, 265.
—— *macroptera*, 269.
—— *novæguineæ*, 266.
—— *picina*, 263, 265.
—— *rutilus*, 266.
—— *sabini*, 264.
—— *ussheri*, 264.
Chæturellus, 267, 268.
—— *rutilus*, 267.
Chalcites basalis, 339, 338.
——, *Cuculus*, 338, 339, 345, 356.
—— *metallicus*, 354.
—— *minutillus*, 364.
—— *osculans*, 331, 332.
—— *plagosus*, 354.
—— *pæcilurus*, 364.
—— *russata*, 364.
Chalcites simplex, 293.
Chalcococcyx, 285, 338.
—— *basalis*, 324, 339.
—— *lucidus*, 349, 352.
—— *malayanus*, 361, 362, 364, 366.
—— *minutillus*, 361, 362.
—— *plagosus*, 324, 354.
—— *pæcilurus*, 364, 366, 367.
—— *russatus*, 380.
Chalybæus cornutus, 108.
Channel Bill, 376.
—— —, New Holland, 376.
chelicutensis, *Chelicutia*, 143.
chelicuti, *Alcedo*, 149, 160.
——, *Chelicutia*, 143.
Chelicutia, 143, 144, 148, 150, 151, 153, 160, 161.
—— *chelicutensis*, 143.
—— *chelicuti*, 143.
Chelicutona, 150, 160, 161.
Chestnut-breasted Cuckoo, 328.
chionoptera, *Diomedea*, 427, 428, 429, 430.
chloris, *Sauropatis*, 144, 146, 195.
chlorocephala, *Dacelo*, 181.
chloropsis, *Melithreptes*, 303.
chlororhynchus, *Puffinus*, 417.
Choacalcyon, 115.
Chonalcyon, 115.
Chordeiles, 220.
Choucalcyon, 115, 116, 143, 144, 146.
—— *australe*, 116, 118, 143.
—— *gaudichaudi*, 116, 143.
Chrysococcyx, 282, 284.
—— *barnardi*, 364, 361.
—— *basalis*, 339.
—— — *basalis*, 345, 366.
—— — *mellori*, 339, 345.
—— — *wyndhami*, 339, 345.
—— *lucidus*, 339, 342, 349, 354.
—— *minutillus*, 361, 365, 366.
—— — *melvillensis*, 361.
—— — *perplexus*, 361.
—— *osculans*, 332.
—— *plagosus*, 357.
—— — *carteri*, 354, 360.
—— — *plagosus*, 354, 360.
—— — *tasmanicus*, 354, 359.
—— *russata*, 364, 366, 367.
chrysops, *Paraptilotis*, 307, 318, 325, 345, 359.
chrysoptera, *Anthochaera*, 307.
——, *Littlera*, 307, 325, 344, 359.
——, *Neositta*, 307, 325, 345, 359.
chrysopterygius, *Psephotellus*, 431.
——, *Psephotus*, 431, 432.
chrysorrhoea, *Acanthiza*, 359.
chrysorrhous, *Geobasileus*, 318, 342, 345, 359.
Chthonicola sagittata, 318, 334, 336, 345, 359.
Cinathisma, 420.
—— *cyaneoleuca*, 421, 422, 424.
cinctus, *Alisteranus*, 345.
cineraceus, *Cuculus*, 312, 314, 319.

THE BIRDS OF AUSTRALIA.

- cinereifrons*, *Heteromyias*, 359.
cinereus, *Cacomantis*, 293.
 —, *Cuculus*, 293.
 —, *Podargus*, 5, 28, 36.
cinnamomina, *Halcyon*, 153, 154.
cinnamominus, *Halcyon*, 153, 181.
Cipselus, 275.
ciris, *Acanthylis*, 270.
 —, *Chætura*, 270.
 —, *Hirundo*, 269, 271.
Cissomela nigra, 345, 359.
Cisticola exilis, 345, 359.
Cittura, 162.
cliftoni, *Dacelo leachii*, 132, 139, 140.
Climacteris, 61.
 — *leucophæa*, 307.
Clytoceyx, 106, 146.
Coccystes, 282.
Coccyzus, 282.
Colaris, 69.
colcloughi, *Micropus*, 276, 280.
 —, *Sauropatis sordida*, 193, 195, 196.
 Cold-river Goatsucker, 5.
Coleia carunculata, 307.
collaris, 69.
 —, *Alcedo*, 142.
 —, *Halcyon*, 180, 183.
collectoris, *Ceyx*, 96.
Collocalia, 246, 247, 251, 255, 258, 262, 265.
 — *aerophila*, 258.
 — *esculenta*, 260, 256.
 — *francica*, 248, 251, 252, 256.
 — — *francica*, 252.
 — — *germaini*, 252.
 — — *inexpectata*, 252.
 — — *spodiopygia*, 252.
 — — *terræreginæ*, 248, 252, 254, 259.
 — — *townsendi*, 252.
 — — *yorki*, 255.
 — — *zoonava*, 248, 254.
 — *fuciphaga*, 251, 256, 257, 258.
 — — *aerophila*, 257.
 — — *amechana*, 257.
 — — *amelis*, 258.
 — — *brevirostris*, 257.
 — — *capnitis*, 257.
 — — *elaphra*, 257.
 — — *fuciphaga*, 257.
 — — *hirundinacea*, 258.
 — — *inquieta*, 258.
 — — *mearnsi*, 257.
 — — *micans*, 257.
 — — *moluccarum*, 258.
 — — *tachyptera*, 257, 258.
 — — *unicolor*, 258.
 — — *vanikorensis*, 257, 258, 259.
 — — *vestita*, 257.
 — — *yorki*, 255.
 — *hirundinacea*, 258.
Collocalia inexpectata, 252.
 — *infusata*, 252.
 — *innominata*, 246, 251.
 — *merguiensis*, 252.
 — *terræreginæ*, 248, 251, 255.
 — *unicolor*, 256.
Colluricincla harmonica, 307, 359, 379.
Colocalia, 260.
colonus, *Halcyon sordidus*, 195, 196.
Columba pacifica, 414.
 — *pallida*, 293, 308.
concreta, *Dacelo*, 159.
concretus, *Caridagrus*, 144, 161.
 —, *Halcyon*, 157.
confusa, *Sauropatis sancta*, 181, 191.
confusus, *Dacelalcyon*, 117, 159.
 —, *Halcyon sanctus*, 181, 190.
connectens, *Syma torotoro*, 114.
Conopoderas australis, 307, 359.
Conopophila rufogularis, 301, 325.
cooktowni, *Halcyon sordidus*, 193, 195.
Coracias orientalis, 70.
 — *pacifica*, 70, 72.
Coracina novæhollandiæ, 307.
corniculatus, *Tropidorhynchus*, 307, 374.
cornutus, *Chalybæus*, 108.
cornwalli, *Podargus strigoides*, 7, 31, 35.
coromanda, *Alcedo*, 142, 151.
 —, *Entomothera*, 98, 160.
 —, *Halcyon*, 98.
coronatus, *Malurus*, 325.
 —, *Phyllergates*, 291.
coronoides, *Corvus*, 380.
Corvus bennetti, 381.
 — *coronoides*, 380.
Corydonix, 386.
 — *giganteus*, 384.
 — *phasianus*, 384.
 — *variegatus*, 384.
Corythornis, 80.
Coua, 283.
Coucal, 384.
couesi, *Puffinus*, 423, 424.
Cosmaerops, 207.
 — *ornatus*, 208, 205, 206, 209.
 — — *ornatus*, 209.
 — — *shortridgei*, 209.
crassirostris, *Caprimulgus*, 36.
cratitius, *Lichenostomus*, 307.
 Crested Goatsucker, 52, 53.
crinifrons, *Ægotheles*, 51, 52.
cristata, *Ægotheles*, 53, 51, 65.
 —, — *cristata*, 54, 64.
 —, *Oreoica*, 307.
cristatus, *Caprimulgus*, 53, 55.
 —, *Ægotheles*, 54.
Crotophaga, 283.
 Cuckoo, Black-eared, 332.
 —, Blue-headed, 370.
 —, Broad-billed Bronze, 349.

INDEX.

- Cuckoo, Bronze, 354, 284.
 —, Chestnut-breasted, 328.
 —, Fan-tailed, 312.
 —, Flinders, 370.
 —, Little Bronze, 361.
 —, Narrow-billed Bronze, 339.
 —, Oriental, 287.
 —, Pallid, 293, 306.
 —, Rufous-breasted Bronze, 364.
 —, Square-tailed (Brush), 321.
cucullata, *Melanodryas*, 307, 359.
Cuculus, 282, 284, 285, 292, 305.
 — *assimilis*, 325, 326.
 — *albostrigatus*, 293, 295.
 — *basalis*, 334, 335, 339, 341, 345.
 — *brisbanensis*, 321.
 — *bubu*, 287.
 — *canoroides*, 287, 288, 289, 290.
 — *canorus*, 286, 288, 290, 296, 304.
 — — *optatus*, 290.
 — *cantor*, 287.
 — *castaneiventris*, 328.
 — *chalcites*, 338, 346, 356.
 — *cineraceus*, 312, 314, 319.
 — *cinereus*, 293.
 — *cycnocephalus*, 370, 372.
 — *dumetorum*, 321, 323, 326.
 — *flabelliformis*, 319, 320, 329.
 — *fucatus*, 287.
 — *horsfieldii*, 287.
 — *incertus*, 312, 314, 319, 323.
 — *infaustus*, 325.
 — *inornatus*, 293, 295, 308.
 — *insperatus*, 321, 323, 325.
 — *intermedius*, 287, 289.
 — *layardi*, 352.
 — *lucidus*, 349, 351, 352, 353, 354, 355, 356, 357, 359.
 — *metallicus*, 354, 356.
 — *nitens*, 349.
 — *optatus*, 287, 286, 288, 289, 290, 291.
 — — *belli*, 287, 290.
 — — *optatus*, 287.
 — *orientalis*, 370, 371.
 — *osculans*, 332.
 — *pallidus*, 293, 296, 301, 306, 318, 324.
 — — *occidentalis*, 294.
 — — *pallidus*, 284.
 — *palliatus*, 331, 336.
 — *peninsulæ*, 331, 336.
 — *phasianinus*, 384, 386.
 — *plagosus*, 334, 341, 343, 351, 352, 353, 354, 359.
 — *pyrrhophanus*, 321, 325, 326.
 — — *dumetorum*, 322.
 — — *variolosus*, 321.
 — *rubricatus albani*, 313, 320.
 — — *athertoni*, 312, 320.
 — — *rubricatus*, 312, 320.
 — *rufulus*, 312.
Cuculus russata, 329.
 — *saturatus*, 287, 290.
 — *temminckii*, 346.
 — *tenuirostris*, 287.
 — *tymbonomus*, 321, 325.
 — *variegatus*, 293, 294, 308.
 — *variolosus*, 321, 322, 325, 326.
 — *versicolor*, 356.
 — *viridirufus*, 321.
 — *waigoui*, 291.
 — *westwoodia*, 322.
culicivorus, *Ethelornis*, 359.
cuneata, *Stictopeleia*, 344.
cuneatus, *Puffinus*, 417.
cuneicaudata, *Strepera*, 126.
cuvieri, *Podargus*, 6, 28, 29, 30.
 —, — *strigoides*, 7, 34.
Cyanalcyon, 81, 144, 145, 146, 147, 148, 154, 160, 161, 168.
 — *lazulinus*, 170.
 — *macleayi*, 116, 144, 164, 165.
 — — *barnardi*, 164, 168, 169, 170.
 — — *distinguendus*, 164, 168.
 — — *macleayi*, 164, 168.
 — — *publa*, 164, 168.
 — *pyrrhopygia*, 116, 143, 173.
 — *pyrrhopygius*, 173, 172.
 — — *obscurus*, 174.
 — — *pyrrhopygius*, 174.
 — — *utingi*, 174.
 — *quadricolor*, 155.
 — *stictolæma*, 155.
cyanea, *Ceyx*, 84, 90.
cyaneiventris, *Alcedo*, 152, 153, 160, 162.
cyaneoleuca, *Cinathisma*, 421, 422, 424.
cyaneus, *Malurus*, 307, 318, 325, 345, 357, 359.
cyanipectus, *Alcyon*, 82, 99.
 —, *Ceyx*, 83.
cycnocephala, *Eudynamis*, 370.
 — *Ryania*, 325.
cycnocephalus, *Cuculus*, 370, 372.
 — *Eudynamis orientalis*, 370.
 — *Eudynamys*, 370.
 — — *orientalis*, 374.
 — *Monachalcyon*, 117.
Cycnoceyx, 98.
cyanooleuca, *Grallina*, 307, 374.
cyanopectus, *Ceyx*, 97.
 —, *Ceycalcyon*, 97.
cycnopterus, *Pseudartamus*, 307, 318.
cyanothis, *Entomyzon*, 307, 374.
cyanothis, *Hallornis*, 345, 359.
Cyphorhina papuensis, 42.
 — — *baileyi*, 46.
 — *plumifera*, 42.
 — — *neglecta*, 42, 43.
 — — *plumifera*, 42.
Cypsela, 275.
Cypseli, 247.
Cypseloides, 263, 266, 267, 268.

THE BIRDS OF AUSTRALIA.

- Cypseloides fumigata*, 266.
Cypselus, 275.
 — *australis*, 276.
 — *pacificus*, 276, 280.
 — *senex*, 266.
 — *terræreginæ*, 248, 256.
 — *vittatus*, 276.
Cyrtostomus frenatus, 359.

Dacelalcyon confusus, 117, 159.
Dacelo, 79, 82, 106, 115, 116, 117, 143, 145, 146, 156.
 — *cervicalis*, 132.
 — *cervina*, 131, 134, 135, 138, 139.
 — *chlorocephala*, 181.
 — *concreta*, 159.
 — *fulvus*, 118.
 — *gigantea*, 116, 118.
 — *gigas*, 118, 81, 115, 117, 122, 123, 125, 128, 133, 134, 135, 138, 143, 185.
 — — *mclennani*, 119, 130.
 — — *minor*, 119, 130.
 — — *tregellasi*, 119, 130.
 — — *watsoni*, 119, 130.
 — *intermedia*, 139.
 — *leachii*, 131, 117, 123, 134, 135, 138, 139.
 — — *cervina*, 132, 139, 140.
 — — *cliftoni*, 132, 139, 140.
 — — *intermedia*, 139.
 — — *intermedius*, 139, 140.
 — — *kempi*, 132, 139.
 — — *leachii*, 132, 139.
 — — *macarthuri*, 140.
 — — *mungi*, 132, 139, 140.
 — — *nana*, 132, 139, 140.
 — — *occidentalis*, 132, 139, 140.
 — — *superfluus*, 140.
 — *macleayii*, 163.
 — *mclennani*, 119.
 — *minor*, 119, 135.
 — *occidentalis*, 132, 138, 139.
 — *princeps*, 117.
 — *pyrrhopygia*, 173.
 — *salussii*, 132.
 — *sancta*, 181.
 — *sylvia*, 200.
dea, *Alcedo*, 198, 199.
dendyi, *Podargus strigoides*, 8, 36.
Dicruropsis bracteatus, 307, 374.
diemenensis, *Alcyone*, 85, 87, 88, 90.
 — — *azurea*, 85.
diemensis, *Alcyone*, 85.
Dilazula, 155, 160, 162.
Dilazulena, 155.
dillwynni, *Ceyx*, 96.
Diomedæa epomophora, 428, 429.
Diomedea chionopectera, 427, 428, 430.
 — *exulans*, 427, 428, 429, 430.
 — *rothschildi*, 429.
 — *irrorata*, 428.

Diomedea regia, 427, 428, 429, 430.
 — *rohui*, 427.
 — *sanfordi*, 428, 429.
diops, *Halcyon*, 154, 170.
Diplopterus, 282.
dispar, *Ceyx*, 96.
dissimilis, *Psephotellus*, 432, 434.
distincta, *Alcyone azurea*, 94.
distinguenda, *Lazulena macleayii*, 169.
distinguendus, *Cyanalcyon macleayii*, 164, 168.
 — *Halcyon macleayii*, 164, 167, 168, 169.
divinus, *Todiramphus*, 142.
Dollar Bird, 70.
dryas, *Halcyon*, 149.
Drymodes, 108.
dubius, *Ægotheles*, 64.
dumetorum, *Cacomantis*, 321.
 — — *pyrrhophanus*, 322, 326.
 — *Cuculus*, 321, 323, 325, 326.
 — — *pyrrhophanus*, 322.
dydimus, *Uralcyon sylvia*, 200.
Dynamene, 369.

Edquista, 198.
elephra, *Collocalia fuciphaga*, 257.
Entomobia, 144, 148, 152, 160.
Entomophila, 142.
Entomothera, 142, 143, 144, 151, 152, 153, 161.
 — *coromanda*, 98, 160.
Entomyzon cyanotis, 307, 374.
Eopsaltria australis, 307, 318, 325, 359.
epomophora, *Diomedæa*, 428, 429.
Epthianura albifrons, 307, 318, 345, 359.
 — *tricolor*, 344.
Erythrodryas rodinogaster, 359.
Erythrorchus radiatus queenslandicus, 433.
esculenta, *Collocalia*, 260, 256.
 — *Hirundo*, 246, 260.
 — *Salangana*, 260.
Ethelornis culicivorus, 359.
 — *magnirostris*, 307, 359.
Eucægotheles, 52.
Eudynamis, 282, 369.
 — *australis*, 370.
 — *cycnocephala*, 370.
 — *flindersi*, 372, 381.
 — *orientalis cycnocephalus*, 370.
 — — *flindersii*, 370.
 — — *subcycnocephalus*, 370.
Eudynamys, 283, 369, 371.
 — *cycnocephalus*, 370.
 — *flindersii*, 370, 372.
 — *orientalis*, 370, 369, 372.
 — — *cycnocephalus*, 374.
 — — *subcycnocephalus*, 374.
 — *maculatus*, 369.
europæus, *Caprimulgus*, 234, 235.
Eurostopodus, 219, 220, 391.
 — *albigularis*, 221, 231.
 — *albogularis*, 224, 232.

INDEX.

- Eurostopodus argus*, 224, 233.
 ——— *argus*, 227, 233.
 ——— *harterti*, 227, 233.
 ——— *astrolabæ*, 226.
 ——— *guttatus*, 227, 220.
 ——— *guttatus*, 233.
 ——— *harterti*, 233.
 ——— *mystacalis*, 221, 219, 220, 223.
 ——— *victoriæ*, 221.
Eurostopus, 219, 221, 227, 391.
 ——— *argus*, 227, 230, 232.
 ——— *guttatus*, 231.
Eurystomus, 69.
 ——— *australis*, 70, 72, 77.
 ——— *orientalis*, 70, 69, 77, 78.
 ——— *bravi*, 71, 77.
 ——— *pacificus*, 70, 77.
 ——— *pacificus*, 70, 72, 78.
euerythra, *Ceyx*, 96.
ewingii, *Acanthiza*, 345, 359.
exilis, *Cisticola*, 345, 359.
Eximiornis, 235.
eximius, *Caprimulgus*, 235.
exulans, *Diomedea*, 427, 428, 429, 430.
eyrei, *Cacomantis eyrei*, 320.

Falcunculus frontatus, 307.
 Fan-tailed Cuckoo, 312.
farquhari, *Halcyon*, 154, 170.
fasciatus, *Ramsayornis*, 307, 319, 325.
fascinans, *Microeca*, 307, 325, 344, 359.
fasciocularis, *Melithreptus*, 318.
fischeri, *Æstrelata*, 425.
flabellifera, *Rhipidura*, 307, 318, 325, 344, 359.
flabelliformis, *Cacomantis*, 312, 319, 323, 324, 329.
 ———, *Cuculus*, 319, 320.
flava, *Broadbentia*, 307, 325.
flavescens, *Ptilotula*, 325.
flavicollis, *Nesoptilotis*, 307, 318.
flavigaster, *Kempia*, 325.
flavigula, *Myzantha*, 307.
flavigularis, *Ptilotis*, 301.
flavirostris, *Halcyon*, 107, 108, 144.
 ———, *Syma*, 107, 108, 110, 112.
 ——— *torotoro*, 107, 111, 112, 113, 114.
flaviventris, *Sphecotheres*, 374.
flavus, *Cacomantis*, 311.
 Flinders Cuckoo, 370.
flindersii, *Eudynamis*, 372, 381.
 ———, ——— *orientalis*, 370.
 ———, *Eudynamys*, 370, 372.
floccosus, *Pycnoptilus*, 318.
flumenicola, *argyroceyx argentata*, 97.
 ———, *Ceyx*, 97.
 Fluttering Petrel, 421.
 Flycatcher, Brown, 125.
forbesi, *Halcyon torquatus*, 149.
 Forest Kingfisher, 163.
forsteri, *Herse*, 253.

fosteri, *Sauropatis sancta*, 191.
 ———, *Zoonava francica*, 253.
francica, *Collocalia*, 248, 251, 252, 256.
 ———, ——— *francica*, 252.
 ———, *Hirundo*, 248.
 ———, *Salangana*, 248.
 ———, *Zoonava*, 248, 246, 247, 253.
 ———, ——— *francica*, 253.
 Freckled Frogmouth, 19.
 Frogmouth, Freckled, 19.
 ———, Large, 46.
 ———, Marbled, 39.
 ———, Plumed, 42.
 ———, Shortwinged, 19.
 ———, Tawny, 5.
frontalis, *Sericornis*, 317.
frontatus, *Falcunculus*, 307.
funebis, *Halcyon*, 161.
 ———, *Todiramphus*, 156.
fuciphaga, *Collocalia*, 251, 256, 257, 258.
 ———, ——— *fuciphaga*, 257.
 ———, *Hirundo*, 255.
 ———, *Zoonava*, 255, 246.
fulgidus, *Caridonax*, 144, 160.
 ———, *Monachalcyon*, 116.
fuliginosus, *Calamanthus*, 307, 318, 344.
fulvifrons, *Glyciphila*, 325.
fulvus, *Dacelo*, 118.
fumigata, *Cypseloides*, 266.
fusca, *Alcedo*, 118, 144.
 ———, *Chætura*, 269.
 ———, *Hirundo*, 269, 270.
 ———, *Paraptilotis*, 307, 345.
 ———, *Wilsonavis*, 318, 325, 344, 359.
fuscatus, *Cuculus*, 287.

Galgulus pacifica, 70.
gaudichaudi, *Choucalcyon*, 116, 143.
 ———, *Monachalcyon*, 116, 143.
 ———, *Sauromarptis*, 116.
gavia, *Puffinus*, 422, 424.
 ———, ——— *assimilis*, 420.
 ———, *Procellaria*, 424.
gentiana, *Ceyx*, 95.
Geobasileus chrysorrhous, 318, 342, 345, 359.
 ——— *reguloides*, 345, 359.
Geococcyx, 283.
germaini, *Collocalia francica*, 252.
 ———, *Zoonava francica*, 253.
Gerygone magnirostris, 366.
 ——— *olivacea*, 318, 325, 344, 359.
 ——— *personata*, 366.
gigantea, *Dacelo*, 116, 118.
 ———, *Hirundapus*, 263.
giganteus, *Corydonix*, 384.
gigas, *Alcedo*, 118.
 ———, *Centropus*, 384.
 ———, *Dacelo*, 118, 81, 115, 117, 122, 123, 125, 128, 133, 134, 135, 138, 143, 185.
 ———, ——— *gigas*, 119, 130.

THE BIRDS OF AUSTRALIA.

- gigas*, *Paralcyon*, 119.
 —, *Podargus*, 36.
 —, *Polophilus*, 384.
Gilbertornis rufogularis, 307.
Gliciphila albifrons, 345.
 — *melanops*, 307, 345, 359.
Globicera, 413, 414.
 — *pacifica*, 414, 413.
 — — *lepida*, 414.
 — — *pacifica*, 415.
 — — *queenslandica*, 414, 415.
 — *rubricera*, 414.
Glyciphila fulvifrons, 325.
 — *modesta*, 324, 329.
 Goatsucker, Banded, 53.
 —, Cold-river, 5.
 —, Crested, 52, 53.
 —, Gracile, 5.
 —, Great-headed, 5.
 —, New Holland, 53.
 —, Strigoid, 5.
 —, Wedge-tailed, 5.
 Golden-shouldered Parrot, 431.
goodenovii, *Whiteornis*, 307, 318, 344, 359.
goodfellowi, *Ceyx*, 96.
gouldi, *Podargus*, 7, 19, 31, 37.
 —, — *strigoides*, 8, 35.
 —, *Zosterops*, 345, 359.
 Gracile Goatsucker, 5.
gracilis, *Caprimulgus*, 5, 36.
graculina, *Strepera*, 380.
Grallina cyanoleuca, 307, 374.
grandidieri, *Chætura*, 247, 265.
 —, *Zoonavena*, 265.
 Great Brown Kingfisher, 118.
 — headed Goatsucker, 5.
 Grey-rumped Swiftlet, 248.
Guira, 283.
gularis, *Alcedo*, 152, 160.
 —, *Melithreptus*, 300, 307.
 —, *Merops*, 206.
guttata, *Loxia*, 434.
 —, *Tavistocka*, 434.
 —, — *guttata*, 434.
guttatus, *Caprimulgus*, 221, 226, 227, 229, 231, 232.
 —, *Eurostopodus*, 227, 220.
 —, — *guttatus*, 233.
 —, *Eurostopus*, 231.
Gymnopus, 311.
Halcyon, 81, 98, 106, 141, 142, 143, 144, 145, 146, 147, 148, 150, 151, 153, 172, 179.
 — — *ænigma*, 195.
 — — *albonotata*, 154.
 — — *australasiæ*, 153.
 — — *badia*, 152, 160.
 — — *barnardi*, 164, 167, 169.
 — — *bougainvillei*, 159.
 — — *cinnamomina*, 153, 154.
Halcyon cinnamominus, 153, 181.
 — — *mediocris*, 153.
 — — *rufigularis*, 153.
 — *collaris*, 180, 182.
 — *concretus*, 157.
 — *coromanda*, 98.
 — *diops*, 154, 170.
 — *dryas*, 149.
 — *farguhari*, 154, 170.
 — *flavirostris*, 107, 108, 144.
 — *funebis*, 161.
 — *hombroni*, 161.
 — *incinctus*, 163, 169.
 — *irroratus*, 160.
 — *jacquinoti*, 170.
 — *lazuli*, 154, 170.
 — *leucocephala*, 150, 160.
 — *leucogaster*, 97.
 — *leucopygia*, 154.
 — *lindsayi*, 157, 161.
 — *macleayi*, 144, 154, 163, 168, 170, 171.
 — — *barnardi*, 164, 167.
 — — *cæruleus*, 164, 168, 169.
 — — *distinguendus*, 164, 167, 168, 169.
 — — *insularis*, 171.
 — — *macleayi*, 164, 167, 171.
 — — *publa*, 164, 168.
 — *monacha*, 117.
 — *monachus*, 117.
 — *moseleyi*, 157, 161.
 — *nigrocyanæa*, 155.
 — *norfolkensis*, 191.
 — *pyrrhopygia*, 144, 146, 173.
 — *pyrrhopygius*, 160.
 — — *obscurus*, 173, 178.
 — — *pyrrhopygius*, 173, 178.
 — — *utingi*, 173, 178.
 — *reichenbachii*, 153.
 — *sacer*, 180.
 — *sancta*, 164.
 — *sanctus*, 144, 146, 180, 182, 183, 185, 189, 190, 191, 194, 195.
 — — *confusus*, 181, 190.
 — — *ramsayi*, 181, 189, 190.
 — — *sanctus*, 181, 189.
 — — *westralasianus*, 181, 189.
 — *saurophaga*, 156, 160.
 — *semicæruleus*, 150, 160.
 — *senegalensis*, 147, 148, 160.
 — *senegaloides*, 149, 160.
 — *sordidus*, 144, 193, 195, 196.
 — — *colonus*, 195, 196.
 — — *cooktowni*, 193, 195.
 — — *melvillensis*, 193, 195.
 — — *sordidus*, 193, 195.
 — *torquatus*, 149, 160.
 — — *forbesi*, 149.
 — — *malimbicus*, 149.
 — *westralasianus*, 185.
 — *winchelli*, 165.

INDEX.

Halcyone, 82.
Halcyonopa, 151, 152, 160, 161.
halli, *Alcyone pusilla*, 100, 102.
 —, *Micralcyone*, 100.
 —, — *pusilla*, 100, 104.
Hallornis cyanotus, 345, 359.
harmonica, *Colluricincla*, 307, 359, 374.
Harriwhitea, 408.
 — *alberti*, 409, 408.
 — — *alberti*, 409, 412.
 — — *rufa*, 409, 412.
harterti, *Eurostopodus argus*, 227, 233.
 — — *guttatus*, 233.
Hemiprocne, 260, 261, 262, 267.
Hemipuffinus, 422.
Herse forsteri, 253.
Heteromyias cinereifrons, 359.
Heteroscenes, 284, 285, 292, 305.
 — *occidentalis*, 293, 309.
 — *pallidus*, 293, 292, 309.
 — — *occidentalis*, 294.
 — — *pallidus*, 294.
 — — *tasmanicus*, 294.
Hirundapus, 261, 263, 265.
 — *caudacutus*, 269.
 — *gigantea*, 263.
 — *nudipes*, 261, 274.
hirundinacea, *Collocalia*, 258.
 —, — *fuciphaga*, 258.
hirundinaceum, *Austroedicæum*, 318, 345.
Hirundinapus, 261.
Hirundo caudacuta, 269.
 — *caudacutus*, 270.
 — *ciris*, 269, 271.
 — *esculenta*, 246, 260.
 — *francica*, 248.
 — *fuciphaga*, 255.
 — *fusca*, 269, 270.
 — *neoxena*, 359.
 — *pacifica*, 276.
 — *peruviana*, 252, 253.
 — *rutula*, 267.
 — *vanikorensis*, 259.
 — *zonaris*, 262, 263.
hombroni, *Actenoides*, 158.
 —, *Halcyon*, 161.
Hornbill, Anomalous, 376.
 —, Psittaceous, 376.
horsfieldii, *Cuculus*, 287.
Howeavis rufifrons, 307, 325, 344.
humeralis, *Caprimulgus*, 7.
 —, *Podargus*, 6, 28, 29, 36.
humilis, *Tasmanornis*, 307, 318.
huttoni, *Puffinus reinholdi*, 421.
hydrocharis, *Tanysiptera*, 203.
Hydrochelidon, 108.
Hylacola cauta, 318, 344.
 — *pyrrhopygia*, 324.
Hylochelidon nigricans, 359.
Hyposyma, 154, 161.

Ieracidea, 61, 66.
 — *berigora*, 66.
incertus, *Cacomantis*, 318.
 —, *Cuculus*, 312, 314, 319, 323.
incinctus, *Halcyon*, 163, 169.
Indian Bee-eater, 210.
Indicapus, 265, 266, 268.
 — *sylvaticus*, 265.
indistincta, *Stigmatops*, 345.
inexpectata, *Collocalia*, 252.
 —, — *francica*, 252.
 —, *Procellaria*, 425.
 —, *Pterodroma*, 425.
 —, *Zoonava francica*, 253.
infaustus, *Cuculus*, 325.
infusata, *Zoonava francica*, 253.
innominata, *Ceyx*, 96.
 —, *Collocalia*, 246, 251.
inornata, *Acanthiza*, 359.
inornatus, *Cacomantis*, 293.
 —, *Cuculus*, 293, 295, 308.
inquieta, *Collocalia fuciphaga*, 258.
 —, *Seisura*, 344.
 —, *Sisura*, 307.
insignis, *Ægotheles*, 51.
insperatus, *Cacomantis*, 321.
 —, *Cuculus*, 321, 323.
insularis, *Halcyon macleayi*, 171.
intermedia, *Dacelo*, 139.
 —, — *leachii*, 139.
 —, *Menura novæhollandiæ*, 396, 407.
intermedius, *Cuculus*, 287, 289.
 —, *Dacelo leachii*, 139, 140.
irrorata, *Diomedea*, 428.
irroratus, *Halcyon*, 160.
ispida, *Alcedo*, 81, 87, 142.
Ispidella, 97, 99.
 — *leucogaster*, 97.
Ispidina, 80, 97, 99.
 —, *leucogaster*, 80, 99.
jacquinoti, *Actenoides*, 170.
 —, *Halcyon*, 170.
keartlandi, *Lichenostomus*, 307.
keatsi, *Caprimulgus macrurus*, 236, 239, 240, 241, 242.
 —, *Polophilus phasianus*, 385, 390.
 —, *Rossornis macrurus*, 242, 243.
kempi, *Dacelo leachii*, 132, 139.
Kempia flavigaster, 325.
Kingfisher, Azure, 84.
 —, Barnard, 167.
 —, Blue, 84.
 —, Blue-winged, 131.
 —, Brown, 118.
 —, Forest, 163.
 —, Great Brown, 118.
 —, Little, 100.
 —, Mangrove, 193.

THE BIRDS OF AUSTRALIA.

- Kingfisher, New Holland, 131
 —, Red-backed, 173.
 —, Sacred, 180.
 —, Three-toed, 122.
 —, White-tailed, 200.
 —, Yellow-billed, 107.
 Koel, 370.
kuehni, *Caprimulgus macrurus*, 244.
- Lacedo*, 106, 144.
laevigaster, *Wilsonavis*, 344, 359.
Lalage tricolor, 307, 318, 359.
lamberti, *Leggeornis*, 318, 325, 345.
Lamprococcyx, 282, 285, 305, 306, 331, 337, 338.
 — *basalis*, 339, 343, 346.
 — *lucidus*, 349, 348, 353, 356.
 — — *australis*, 349, 352.
 — — *lucidus*, 353.
 — *malayanus*, 361, 362, 364.
 — *minutillus*, 361, 348, 360, 362, 364.
 — — *minutillus*, 361.
 — — *perplexus*, 361.
 — *modesta*, 339, 346.
 — *plagosus*, 354, 343, 348, 356, 357, 360, 362.
 — — *carteri*, 354.
 — — *plagosus*, 354.
 — — *tasmanicus*, 354.
 — *pæcilurus*, 362.
 — *russata*, 364.
 — *russatus*, 364, 347, 348, 360, 362.
 — — *barnardi*, 368.
 — — *russatus*, 368.
Lampromorpha plagosus, 354, 358.
lanceolata, *Plectorhyncha*, 307.
 Large Frogmouth, 46.
 — tailed Nightjar, 236.
lateralis, *Zosterops*, 345, 359.
lathamii, *Neosericornis*, 318, 336, 345, 359.
 Laughing Jackass, 118.
Lazulena, 141, 154, 155, 160, 161, 162, 172.
 — *macleayi*, 163, 141, 170.
 — — *barnardi*, 169.
 — — *distinguenda*, 169.
 — — *macleayi*, 169.
 — — *publa*, 170.
lazuli, *Halcyon*, 154, 170.
lazulinus, *Cyanalcyon*, 170.
leachii, *Dacelo*, 131, 117, 123, 134, 135, 138, 139.
 — — *leachii*, 132, 139.
leadbeateri, *Lophoptilotis*, 307, 318, 359.
Leggeornis amabilis, 345.
 — *lamberti*, 318, 325, 345.
leggii, *Petroica*, 325, 357.
lepida, *Carpophaga*, 414.
 —, *Ceyx*, 82, 96, 98.
 —, *Globicera pacifica*, 414.
leschenaultii, *Merops*, 206, 207.
lessoni, *Alcyon*, 82, 94.
 —, — *azurea*, 91, 94.
Leucalcyon, 156, 160, 162.
leucocephala, *Halcyon*, 150, 160.
Leucocirca tricolor, 307, 318, 325, 344, 359.
leucogaster, *Ægotheles*, 54, 62, 63, 65.
 —, — *cristata*, 54, 64, 65.
 —, *Centropus*, 391.
 —, *Halcyon*, 97.
 —, *Ispidella*, 97.
 —, *Polophilus*, 390.
leucophæa, *Climacteris*, 307.
leucopsis, *Aphelocephala*, 345.
leucopygia, *Halcyon*, 154, 170.
leucopygialis, *Acanthylis*, 265.
leucorhynchus, *Artamus*, 307.
leucotis, *Nesoptilotis*, 307, 318, 345, 359.
lewini, *Merops*, 209.
lewini, *Meliphaga*, 307, 318.
Lewinornis rufiventris, 307, 318.
Lichenostomus cratitius, 307.
 — *keartlandi*, 307.
 — *ornatus*, 307, 319, 345, 359.
lindsayi, *Astacophilus*, 144.
 —, *Halcyon*, 157, 161.
lineata, *Acanthiza*, 345, 359.
lineatus, *Cacomantis*, 322, 326.
 —, — *pyrrhophanus*, 326.
 Little Bronze Cuckoo, 361.
Littlera chrysoptera, 307, 324, 344, 359.
longirostris, *Sericornis*, 307, 318, 325.
Lopholæmus antarcticus, 308.
Lopholaimus antarcticus, 415.
Lophoptilotis leadbeateri, 307, 318, 359.
 — *melanops*, 307.
Loxia guttata, 434.
lucidus, *Chalcococcyx*, 349, 352, 354.
 —, *Chrysococcyx*, 339, 342, 349, 354, 355, 356.
 —, *Cuculus*, 349, 351, 352, 353, 354, 356, 357.
 —, *Lamprococcyx*, 349, 339, 346, 348, 353, 356.
 —, — *lucidus*, 353.
lunatus, *Melithreptus*, 307, 318.
lunulata, *Ægotheles*, 54.
Lyncornis papuensis, 226.
Lyma, 105.
lyra, *Mænura*, 395.
lyrata, *Mænura*, 395.
 Lyre-Bird, 395.
 —, Northern, 409.
- macleayi*, *Cyanalcyon*, 116, 144, 154, 163, 165.
 —, *Halcyon*, 144, 154.
 —, *Todiramphus*, 143, 163.
macleayi, *Cyanalcyon macleayi*, 164, 168.
 —, *Dacelo*, 163.
 —, *Halcyon*, 163, 167, 168, 170, 171.
 —, — *macleayi*, 164, 167, 171.
 —, *Lazulena*, 163, 141, 170.
 —, — *macleayi*, 169.

INDEX.

- macroptera*, *Chaetura*, 269.
 —, *Pallene*, 269.
macrorhynchus, *Podargus*, 7, 30, 36.
macrourus, *Centropus*, 385.
 —, — *phasianinus*, 385.
 —, — *phasianus*, 385.
 —, *Polophilus phasianinus*, 385, 390, 391.
macrurus, *Caprimulgus*, 234, 236, 237, 238, 239, 242.
 —, — *macrurus*, 239, 240, 241, 244.
 —, *Polophilus*, 385.
 —, *Rossornis*, 236, 234, 243.
 —, — *macrurus*, 242.
maculatus, *Eudynamys*, 369.
madagascariensis, *Alcedo*, 97.
 —, *Ceycoides*, 98.
Mænura, 394.
 — *lyra*, 395.
 — *lyrata*, 395.
 — *magnifica*, 395.
magnifica, *Carpophaga*, 108.
 —, *Mænura*, 395.
magnificus, *Ptilorhis*, 108.
magnirostris, *Ethelornis*, 307, 359
 —, *Gerygone*, 366.
 —, *Sericornis*, 318, 325, 329, 345, 359.
magnus, *Acanthornis*, 359.
malachurus, *Stipiturus*, 307, 318, 345.
malamaii, *Ceyx*, 96.
malayanus, *Chalcococcyx*, 361, 362, 364, 366.
 —, *Lamprococcyx*, 361, 362, 364.
malimbicus, *Halcyon torquatus*, 149.
Malurus ambilis, 324, 329.
 — *assimilis*, 344.
 — *coronatus*, 325.
 — *cyaneus*, 307, 318, 325, 345, 357, 359.
 — *melanotus*, 345.
 — *splendens*, 345.
 Mangrove Kingfisher, 193.
Manorina melanophrys, 307.
 Marbled Frogmouth, 39.
marmoratus, *Micropodargus*, 39.
 —, — *ocellatus*, 39.
 —, *Podargus*, 39, 43, 47.
 —, — *ocellatus*, 39.
maxillaris, *Sphecotheres*, 307.
mclennani, *Dacelo*, 119.
 —, — *gigas*, 119, 130.
Mearnsia, 263, 265, 268.
mearnsi, *Collocalia fuciphaga*, 257.
mediocris, *Halcyon cinnamominus*, 153.
meeki, *Caprimulgus macrurus*, 244.
 —, *Syma torotoro*, 110, 111, 112, 113, 114.
 —, *Therosa*, 96, 98.
megacephalus, *Caprimulgus*, 5, 36.
 —, *Podargus*, 7, 28, 29.
Megapodargus papuensis, 46.
 — — *baileyi*, 46, 50.
 — — *rogersi*, 46, 50.
Megapodargus plumifera, 42.
 — — *neglecta*, 42.
 — — *plumifera*, 42.
Megapodius, 392.
 — *menura*, 395.
megarhyncha, *Syma*, 110, 113.
Melanalcyon, 156, 161, 162.
melanocephala, *Myzantha*, 307.
 —, *Ryania*, 307, 318, 345, 359.
Melanodryas cucullata, 307, 359.
melanophrys, *Manorina*, 307.
melanops, *Austrartamus*, 307, 359.
 —, *Gliciphila*, 307, 345, 349.
 —, *Lophoptilotis*, 307.
melanopsis, *Monarcha*, 325.
melanotus, *Malurus*, 345.
melanura, *Ceyx*, 82, 96.
melanurus, *Merops*, 109, 210.
 —, *Centropus*, 385.
 —, — *phasianinus*, 385.
 —, — *phasianus*, 385.
 —, *Polophilus*, 385.
 —, — *phasianinus*, 385, 390, 391.
Melidora, 106, 142, 143, 162.
Meliornis australasianus, 317.
 — *niger*, 307, 345.
 — *novæhollandiæ*, 307, 319, 345, 359.
Meliphaga lewinii, 307.
 — *sonora*, 300, 307.
Melithreptes chloropsis, 303.
Melithreptus affinis, 307, 345.
 — *atricapillus*, 307, 318, 359.
 — *fasciogularis*, 318.
 — *gularis*, 300, 307.
 — *lewinii*, 318.
 — *lunatus*, 307, 318.
 — *validirostris*, 307.
Melittophagus, 206.
 — *muelleri*, 206.
 — *ornatus*, 209.
Melittias, 207.
Melloria guoyi, 374.
mellori, *Chrysococcyx basalis*, 339, 345.
 —, *Neochalcites basalis*, 339.
melvillensis, *Ægotheles cristata*, 67.
 —, *Chrysococcyx minutillus*, 361.
 —, *Halcyon sordidus*, 193, 195.
 —, *Podargus strigoides*, 8, 35.
 —, *Polophilus phasianinus*, 391.
 —, *Sauropatis sordida*, 193.
Menura, 392, 393, 394, 398.
 — *alberti*, 409, 411.
 — *novæhollandiæ*, 395, 394, 397, 398.
 — — *intermedea*, 396, 407.
 — — *novæhollandiæ*, 396, 407.
 — — *victoriæ*, 396, 407.
 — *paradisea*, 395.
 —, *Superb*, 395.
 — *superba*, 395, 397, 398, 404, 410, 411.
 — *victoriæ*, 395, 404, 405, 407.

THE BIRDS OF AUSTRALIA.

- Menura vulgaris*, 395.
menura, *Megapodius*, 395.
merguiensis, *Collocalia*, 252.
Meropiscus, 206.
Merops apiaster, 206, 207
—— *gularis*, 206.
—— *leschenaultii*, 206, 207.
—— *lewini*, 209.
—— *melanurus*, 209, 210.
—— *modestus*, 209, 218.
—— *ornatus*, 207, 208, 210, 213.
—— — *ornatus*, 209.
—— — *shortridgei*, 209.
—— *swinhoi*, 206.
—— *tenuipennis*, 209.
—— *viridis*, 210.
Mesocalius, 331.
—— *osculans*, 332.
—— *palliolatus*, 324, 332.
mesophanis, *Caprimulgus macrurus*, 239, 240, 241, 242, 244.
——, *Rossornis macrurus*, 242.
metallicus, *Chalcites*, 354.
——, *Cuculus*, 354, 356.
micans, *Collocalia fuciphaga*, 257.
Micralcyone, 95.
—— *halli*, 100.
—— *pusilla*, 100, 95, 104.
—— — *aolæ*, 104.
—— — *assimilis*, 103.
—— — *bougainvillei*, 104.
—— — *halli*, 100, 104.
—— — *pusilla*, 100, 104.
—— — *ramsayi*, 100, 103.
—— — *richardsi*, 95, 104.
—— — *yorki*, 103.
Micrartamus minor, 307.
Microdynamis parva, 336.
Microeca, 125.
—— *fascinans*, 307, 325, 344, 359.
Microglossus, 108.
Microphilemon orientalis, 374.
Micropodargus, 38.
—— *marmoratus*, 39.
—— *ocellatus*, 39, 38.
—— — *marmoratus*, 39.
—— *plumiferus*, 42.
Micropus, 262, 275.
—— *apus*, 275.
—— *australis*, 276.
—— *colcloughi*, 276, 280
—— *pacificus*, 276.
—— — *pacificus*, 276.
—— *vittata*, 276.
Milligania robustirostris, 345.
Mimeta sagittata, 307, 374.
mindanensis, *Ceyx*, 96.
minor, *Dacelo*, 119, 135.
—— — *gigas*, 119, 130
——, *Micrartamus*, 307.
minutillus, *Chalcococcyx*, 361.
——, *Chalcites*, 364.
——, *Chrysococcyx*, 361, 362, 365, 366.
——, *Lamprococcyx*, 361, 348, 360, 362, 364.
——, — *minutillus*, 361.
mirabilis, *Parkinsonius*, 395.
Misocalius, 285, 331, 332.
—— *palliolatus*, 336.
mixta, *Alcyone azurea*, 85.
modesta, *Glyciphila*, 324, 329.
——, *Lamprococcyx*, 339, 346.
——, *Steganopleura*, 433.
modestus, *Merops*, 209, 218.
——, *Neochalcites basalis*, 339.
——, *Ramsayornis*, 325.
moluccarum, *Collocalia fuciphaga*, 258.
monacha, *Halcyon*, 117.
Monachalcyon, 116, 143, 159.
—— *cianocephalus*, 117.
—— *fulgidus*, 116.
—— *gaudichaudi*, 116, 143.
—— *monachus*, 116, 117, 160.
—— *princeps*, 116, 117, 143.
monachus, *Halcyon*, 117.
——, *Monachalcyon*, 116, 117, 160.
——, *Paralcyon*, 116.
Monarcha melanopsis, 325.
montanellus, *Calamanthus*, 318.
Morganornis superciliosus, 307.
moseleyi, *Actenoides*, 158.
——, *Halcyon*, 157, 161.
Mottled Petrel, 425.
Mountain Bee-eater, 209.
muelleri, *Merops*, 206.
multicolor, *Petroica*, 307, 318, 325, 344, 359.
mungi, *Dacelo leachii*, 132, 139, 140.
——, *Podargus strigoides*, 8, 36.
murchisoniana, *Ægotheles cristata*, 54, 64, 66.
Muscadivores, 413.
Myiagra nitida, 307, 344, 359.
—— *rubecula*, 307, 325, 359.
Myioceyx, 80.
Myristicivora, 413.
mystacalis, *Caprimulgus*, 231, 232.
——, *Eurostopodus*, 221, 219, 220, 223.
Mytisa striata, 318.
Myzantha flavigula, 307.
—— *melanocephala*, 307.
Myzomela sanguinolenta, 345.

nais, *Tanysiptera*, 198.
nana, *Acanthiza*, 318, 345, 359.
——, *Dacelo leachii*, 132, 139, 140.
Narrow-billed Bronze Cuckoo, 339.
natalensis, *Alcedo*, 97.
Neafrapus, 264, 266, 267.
—— *cassini*, 264.
Needle-tailed Swallow, 269.
—— Swift, 262.
neglecta, *Cyphorhina plumifera*, 42, 43.

INDEX.

- neglecta*, *Megapodargus*, 42.
Neochalcites, 285, 305, 338.
 — *barnardi*, 364.
 — *basalis*, 323, 339, 341, 358.
 — — *mellori*, 339.
 — — *modestus*, 339.
 — — *wyndhami*, 339.
 — *russatus*, 364.
Neochmia phaeton, 329, 359.
Neonectris, 422.
Neophilemon buceroides, 307, 374.
Neosericornis lathamii, 318, 336, 348, 359.
Neositta chrysoptera, 307, 325, 345, 359.
neoxena, *Hirundo*, 359.
Nephocætes, 266, 268.
Nephæcetes, 263, 266.
Nesocalius, 331.
Nesoptilotis flavicollis, 307, 318.
 — *leucotis*, 307, 318, 345, 359.
 New Holland Channel Bill, 376.
 — — Goatsucker, 53.
 — — Kingfisher, 131.
 — — Swallow, 276.
Nicoclarus optatus, 286, 287.
niger, *Meliornis*, 307, 345.
 Nightjar, Large-tailed, 236.
 —, Owlet, 53.
 —, Spotted, 227.
 —, White-throated, 221.
nigra, *Cissomela*, 345, 359.
nigricans, *Hylochelidon*, 359.
nigrocyanea, *Halcyon*, 155.
Ninox boobook, 21.
nipalensis, *Caprimulgus macrurus*, 239.
 —, *Rossornis macrurus*, 243.
nitens, *Cuculus*, 349.
nitida, *Myiagra*, 307, 344, 359.
norfolkensis, *Halcyon*, 191.
 Northern Lyre-Bird, 409.
Northipsitta alexandrae, 432.
nova, *Psephotellus chrysapterygus*, 431.
novæguineæ, *Chætura*, 266.
novæhollandiæ, *Ægotheles*, 53, 57, 58, 62, 65.
 —, — *novæhollandiæ*, 63.
 —, *Caprimulgus*, 53, 55.
 —, *Coracina*, 307.
 —, *Meliornis*, 307, 319, 345, 359.
 —, *Menura*, 395, 394, 398.
 —, — *novæhollandiæ*, 396, 397, 407.
 —, *Podargus*, 53.
nudipes, *Hirundapus*, 261, 274.
Nutchera, 153, 160.
Nycticeyx, 115, 116.

oberholseri, *Caprimulgus macrurus*, 244.
 —, *Zoonava francica*, 253.
obscurus, *Cyanalcyon pyrrhopygius*, 174.
 —, *Halcyon pyrrhopygius*, 173, 178.
 —, *Puffinus*, 424.
occidentalis, *Dacelo*, 132, 138, 139.
occidentalis, *Dacelo leachii*, 132, 139, 140.
 —, *Cuculus pallidus*, 294.
 —, *Heteroscenes*, 293, 309.
 —, — *pallidus*, 294.
ocellatus, *Micropodargus*, 39, 38.
 —, *Podargus*, 2, 39, 30, 41.
ochracea, *Syma torotoro*, 111.
Æstrelata fischeri, 425.
olivacea, *Gerygone*, 318, 325, 344, 359.
olivaceus, *Timixos*, 307.
olivei, *Ægotheles cristata*, 65.
Ololygon, 311.
opisthomelas, *Puffinus*, 423.
optatus, *Cuculus*, 287, 286, 288, 289, 290, 291.
 —, — *canorus*, 290.
 —, — *optatus*, 281.
 —, *Nicoclarus*, 287.
Oreoica cristata, 307.
 Oriental Cuckoo, 287.
orientalis, *Coracius*, 70.
 —, *Cuculus*, 370, 371.
 —, *Eudynamys*, 370, 369, 372.
 —, *Eurystomus*, 70, 69, 77, 78.
 —, *Microphilemon*, 374.
Origma rubricata, 319.
 — *solitaria*, 318.
ornata, *Ptilotis*, 61.
 —, *Urica*, 209.
ornatus, *Cosmaerops*, 208, 205, 206, 209.
 —, — *ornatus*, 209.
 —, *Lichenostomus*, 307, 319, 345, 359.
 —, *Melittophagus*, 209.
 —, *Merops*, 207, 208, 213.
 —, — *ornatus*, 209.
 —, *Philemon*, 209.
osculans, *Chalcites*, 323, 331.
 —, *Chrysococcyx*, 332.
 —, *Mesocalius*, 332.
 —, *Misocalius*, 332.
 —, *Owenavis*, 332, 323, 331.
 —, — *osculans*, 332.
Owenavis, 305, 331.
 — *osculans*, 332, 323, 331.
 — — *osculans*, 332.
 — — *rogersi*, 332.
 Owlet Nightjar, 53.

Pachycephala pectoralis, 307, 318, 325.
 — *rufiventris*, 300.
 Pacific Roller, 70.
pacifica, *Columba*, 414.
 —, *Coracius*, 70, 72.
 —, *Galgulus*, 70.
 —, *Globicera*, 414, 413.
 —, — *pacifica*, 415.
 —, *Hirundo*, 276.
pacificus, *Apus*, 276.
 —, *Cypselus*, 276, 280.
 —, *Eurystomus*, 70, 72, 78.
 —, — *orientalis*, 70, 77.

THE BIRDS OF AUSTRALIA.

- pacificus*, *Micropus*, 276.
 —, — *pacificus*, 276.
Pagurothera, 144.
 Pale Pigeon, 293.
Pallene, 261, 263, 265, 267.
 — *caudacuta*, 269.
 — *macroptera*, 269.
Pallenia, 263.
pallescens, *Steganopleura bichenovii*, 434.
 Pallid Cuckoo, 293, 306.
pallida, *Columba*, 293, 308.
pallidus, *Cacomantis*, 289, 294.
 —, *Cuculus*, 293, 296, 301, 306, 318, 324.
 —, — *pallidus*, 294.
 —, *Heteroscenes*, 293, 292, 300.
 —, — *pallidus*, 294.
palliolatus, *Cuculus*, 331, 332, 336.
 —, *Mesocalius*, 324, 332.
 —, *Misocalius*, 336.
Papuanapus, 266, 268.
papuensis, *Lycornis*, 226.
 —, *Podargus*, 2, 17, 43, 46, 47, 48, 49.
paradisea, *Menura*, 395.
 — *parkinsoniana*, 395, 397.
 —, *Ptiloris*, 374.
Paralcyon, 115, 116, 143.
 — *cervina*, 132.
 — *gigas*, 119.
 — *monachus*, 116.
 — *princeps*, 116.
Paraptilotis chrysops, 307, 318, 325, 345, 359.
 — *fusca*, 307, 345.
Pardalotus punctatus, 359.
Parephthianura tricolor, 345, 359.
parkinsoniana, *Paradisea*, 395, 397.
Parkinsonius mirabilis, 395.
 Parrot, Golden-shouldered, 431.
parva, *Microdynamis*, 336.
passerinus, *Cacomantis*, 311.
pectoralis, *Pachycephala*, 307, 318, 325.
Pelargopsis, 144.
Pelagia, 264.
penicillata, *Ptilotula*, 307, 319, 345, 359.
peninsulæ, *Cuculus*, 287.
Penthoceryx, 285.
perplexus, *Chrysococcyx minutillus*, 361.
 —, *Lamprococcyx minutillus*, 361.
personata, *Gerygone*, 366.
 —, *Pseudogerygone*, 359.
personatus, *Campbellornis*, 307.
 —, *Artamus*, 213.
peruviana, *Hirundo*, 252, 253.
 Petrel, Fluttering, 421.
 —, Mottled, 425.
Petroica leggii, 325, 357.
 — *multicolor*, 307, 318, 325, 344, 359.
 — *rodinogaster*, 316.
 — *rosea*, 316.
phaeton, *Neochmia*, 329, 359.
phalænoides, *Podargus*, 6, 18, 19, 28, 29, 30, 31, 36, 37.
 —, — *strigoides*, 7, 30, 36.
phasianinus, *Centropus phasianinus*, 385.
 —, *Cuculus*, 384, 386.
 —, *Polophilus*, 384, 383.
 —, — *phasianinus*, 385, 390.
phasianus, *Centropus*, 381, 389.
 —, *Corydonix*, 384.
Philemon argenticeps, 374.
 — *ornatus*, 209.
philippensis, *Ceyx*, 99.
Phœnicophæes, 282.
phrygia, *Zanthomiza*, 307.
Phylidonyris pyrrhoptera, 307, 345.
Phyllergates coronatus, 291.
Piaya, 282.
picina, *Chaetura*, 263, 265.
Piezorhynchus alecto, 325.
 Pigeon, Pale, 293.
 —, Queensland, 414.
pileata, *Alcedo*, 153, 160.
plagosus, *Chalcites*, 354.
 —, *Chalcococcyx*, 324.
 —, *Chrysococcyx*, 357.
 —, — *plagosus*, 354, 360.
 —, *Cuculus*, 334, 341, 343, 351, 352, 353, 354, 356.
 —, *Lamprococcyx*, 354, 343, 348, 356, 358, 360, 362.
 —, — *plagosus*, 354.
 —, *Lampromorpha*, 354.
Plectorhyncha lanceolata, 307.
Plesialcyon, 152, 160, 161.
plumbea, *Strepera*, 129.
 Plumed Frogmouth, 42.
plumifera, *Cyphorhina*, 42.
 —, — *plumifera*, 42.
 —, *Megapodargus*, 42.
 —, — *plumifera*, 42.
plumiferus, *Micropodargus*, 42.
 —, *Podargus*, 17, 28, 42, 43, 49.
 —, — *papuensis*, 42.
Podargus, 1, 2, 3, 4, 13, 14, 17, 19, 21, 24, 28, 30, 38, 48, 51, 52, 60.
 — *australis*, 5, 36.
 — *brachypterus*, 7, 19, 28, 29, 30, 31, 36.
 — *cinereus*, 5, 36.
 — *cuvieri*, 6, 28, 29, 30.
 — *gigas*, 36.
 — *gouldii*, 7, 19, 31, 37.
 — *humeralis*, 6, 28, 29, 36.
 — *macrorhynchus*, 7, 30, 36.
 — *marmoratus*, 39, 43, 47.
 — *megacephalus*, 7, 28, 29.
 — *novæhollandiæ*, 53.
 — *ocellatus*, 2, 39, 40, 41.
 — *marmoratus*, 39.
 — *papuensis*, 2, 17, 43, 46, 47, 48, 49.
 — *baileyi*, 46, 49.

INDEX.

- Podargus papuensis plumiferus*, 42.
 ——— *rogersi*, 46, 49.
 ——— *phalænoides*, 6, 18, 19, 28, 29, 30, 31, 36, 37.
 ——— *plumiferus*, 17, 28, 42, 43, 49.
 ——— *rossi*, 8, 15, 16, 34.
 ——— *stanleyanus*, 5, 28, 36.
 ——— *strigoides*, 5, 2, 4, 6, 13, 15, 16, 20, 23, 24, 29, 30, 31, 35, 49.
 ——— *brachypterus*, 7, 34.
 ——— *capensis*, 35.
 ——— *centralia*, 34.
 ——— *cornwalli*, 7, 31, 35.
 ——— *cuvieri*, 7, 34.
 ——— *dendyi*, 8, 36.
 ——— *gouldi*, 8, 35.
 ——— *melvillensis*, 8, 35.
 ——— *mungi*, 8, 36.
 ——— *phalænoides*, 7, 30, 36.
 ——— *rossi*, 7, 15, 34.
 ——— *strigoides*, 7, 30, 31.
 ——— *victoriæ*, 7, 31, 34.
 ——— *vincendonii*, 7, 36.
podargus, *Caprimulgus*, 5, 36.
pœcilurus, *Chalcites*, 364.
 ———, *Chalcococcyx*, 364, 366, 367.
 ———, *Lamprococcyx*, 362.
 ——— *gigas*, 384.
 ——— *leucogaster*, 390.
 ——— *macrurus*, 385.
 ——— *melanurus*, 385.
Polophilus, 383, 386.
 ——— *phasianinus*, 384, 383.
 ——— *keatsi*, 385, 390.
 ——— *macrourus*, 385, 390, 391.
 ——— *melanurus*, 385, 390, 391.
 ——— *melvillensis*, 391.
 ——— *phasianinus*, 385, 390.
 ——— *yorki*, 385, 391.
 ——— *phasianus*, 384.
 ——— *variegatus*, 384.
Polyphasia, 311.
Polytelis swainsonii, 433.
princeps, *Dacelo*, 117.
 ———, *Monachalcyon*, 116, 117, 143.
 ———, *Paralcyon*, 116.
Procellaria gavia, 424.
 ——— *inexpectata*, 425.
Psephotellus chrysopterygius, 431.
 ——— *nova*, 431.
 ——— *dissimilis*, 432, 434.
Psephotus chrysopterygius, 431, 432.
Pseudartamus cyanopterus, 307, 318.
Pseudogerygone personata, 359.
pseustes, *Syma torotoro*, 113.
psilopterus, *Ægotheles*, 51, 52.
Psittaceus Hornbill, 376.
Pterodroma inexpectata, 425.
 ——— *thompsoni*, 425.
Pteroptochus, 392, 393.
Ptilorhis magnificus, 108.
Ptiloris paradisea, 374.
Ptilotis analoga, 324, 329.
 ——— *flavigularis*, 301.
 ——— *ornata*, 61.
 ——— *sonora*, 303.
Ptilotula flavescens, 325.
 ——— *penicillata*, 307, 319, 345, 359.
publa, *Cyanalcyon macleayii*, 164, 168.
 ———, *Halcyon macleayii*, 164, 168.
 ———, *Lazulena macleayii*, 170.
Puffinus, 420, 422, 423.
 ——— *assimilis*, 422, 424.
 ——— *gavia*, 420.
 ——— *auricularis*, 423, 424.
 ——— *bannermani*, 423.
 ——— *chlororhynchus*, 417.
 ——— *couesi*, 423, 424.
 ——— *cuneatus*, 417.
 ——— *gavia*, 422, 424.
 ——— *obscurus*, 424.
 ——— *opisthomelas*, 423.
pulchra, *Ægotheles*, 51.
 ———, *Alcyone*, 83, 85, 88, 89, 94.
 ———, ——— *azurea*, 85, 91.
punctatus, *Pardalotus*, 359.
purpurea, *Ceyx*, 82.
pusilla, *Acanthiza*, 307, 317, 325, 345, 359, 400.
 ———, *Alcyone*, 82, 83, 100, 101, 102, 103, 104.
 ———, ——— *pusilla*, 100, 102.
 ———, *Ceyx*, 100.
 ———, *Micralcyone*, 100, 95, 104.
 ———, ——— *pusilla*, 100, 104.
Pycnoptilus floccosus, 318.
Pyrrhocentor, 283.
Pyrrhocæmus brunneus, 336.
pyrrhophanus, *Cacomantis*, 321.
 ———, *Cuculus*, 321, 325, 326.
pyrrhoptera, *Phylidonyris*, 307, 345.
pyrrhopygia, *Cyanalcyon*, 116, 143, 173.
 ———, *Dacelo*, 173.
 ———, *Halcyon*, 144, 146, 173.
 ———, *Hylacola*, 324.
 ———, *Sauropatis*, 144, 173.
 ———, *Todiramphus*, 143, 173.
pyrrhopygius, *Cyanalcyon*, 173, 172.
 ———, ——— *pyrrhopygius*, 174.
 ———, *Halcyon*, 160.
 ———, ——— *pyrrhopygius*, 173, 178.
quadricolor, *Cyanalcyon*, 155.
Queensland Pigeon, 414.
queenslandica, *Globicera pacifica*, 414, 415.
queenslandicus, *Erythrorhynchus radiatus*, 433.
quoyi, *Melloria*, 374.
ramsayi, *Alcyone*, 100, 102.
 ———, *Halcyon sanctus*, 181, 189, 190.
 ———, *Micralcyone pusilla*, 100, 103.
 ———, *Sauropatis sancta*, 181, 190.
Ramsayornis fasciatus, 307, 319, 325.

THE BIRDS OF AUSTRALIA.

- Ramsayornis modestus*, 325.
recurvirostris, *Todiramphus*, 157, 158, 191.
 Red-backed Kingfisher, 173.
regia, *Diomedea*, 427, 428, 429, 430.
reguloides, *Geobasileus*, 345, 359.
reichenbachii, *Halcyon*, 153.
reinholdi, *Puffinus reinholdi*, 421.
 —, *Reinholdia*, 421, 420.
Reinholdia, 420, 422.
 — *reinholdi*, 421, 420.
 — — *byroni*, 421, 422.
 — — *huttoni*, 421, 422.
 — — *reinholdi*, 421.
Rhaphidura, 261, 265, 266, 268.
Rhipidura albiscapa, 300.
 — *flabellifera*, 307, 318, 325, 344, 359.
 — *tricolor*, 300.
Rhothonia, 429, 430.
richardsi, *Alcyon*, 83, 102, 103, 104.
 —, — *richardsi*, 102.
 —, *Micralcyon pusilla*, 95, 104.
robustirostris, *Milligania*, 345.
rodinogaster, *Erythrodryas*, 359.
 —, *Petroica*, 316.
rogersi, *Megapodargus papuensis*, 46, 50.
 —, *Owenavis osculans*, 332.
 —, *Podargus papuensis*, 46, 49.
 —, *Rossornis macrurus*, 242, 243.
rohui, *Diomedea exulans*, 427.
 Roller Bird, 70.
 —, Pacific, 70.
rosea, *Belchera*, 325.
 —, *Petroica*, 316.
rossi, *Podargus*, 8, 15, 16, 34.
 —, — *strigoides*, 7, 15, 34.
Rossornis, 234.
 — *macrurus*, 236, 234, 242, 243.
 — — *albonotatus*, 243.
 — — *ambiguus*, 243, 245.
 — — *aruensis*, 242, 243.
 — — *atripennis*, 243.
 — — *bimaculatus*, 243.
 — — *coincidens*, 241, 243.
 — — *keatsi*, 242, 243.
 — — *macrurus*, 242.
 — — *mesophanis*, 242.
 — — *nipalensis*, 243.
 — — *rogersi*, 242, 243.
 — — *salvadorii*, 240, 243.
 — — *yorki*, 242, 243.
rothschildi, *Diomedea exulans*, 429.
rubecula, *Myiagra*, 307, 325, 359.
rubiginosus, *Calamanthus*, 344.
rubricata, *Origma*, 319.
 — *Sylvia*, 312, 319.
rubricatus, *Cacomantis*, 312, 313.
 — — *rubricatus*, 313.
 —, *Cuculus rubricatus*, 312, 320.
rubricera, *Globicera*, 414.
rufa, *Ægotheles*, 54, 62, 63.
rufa, *Ægotheles cristata*, 54, 64, 66.
 —, *Harriwhitea alberti*, 409, 412.
rufescens, *Ægotheles*, 54, 62, 63, 66.
ruficauda, *Steganopleura*, 433.
ruficollaris, *Alcyon*, 181, 189.
 —, *Sauropatis sancta*, 181, 190.
rufidorsa, *Ceyx*, 82.
rufifrons, *Howeavis*, 307, 325, 344.
rufigularis, *Halcyon cinnamominus*, 153.
rufiventris, *Lewinornis*, 307, 318.
 — *Pachycephala*, 300.
rufogularis, *Acanthogenys*, 307.
 —, *Conopophila*, 301, 325.
 —, *Gilbertornis*, 307.
 Rufous-breasted Bronze Cuckoo, 364.
rufulus, *Cacomantis*, 312.
 —, *Cuculus*, 312.
russata, *Chalcites*, 364.
 — *Chalcococcyx*, 364, 380.
 — *Chrysococcyx*, 364, 366.
 — *Cuculus*, 329.
 — *Lamprococcyx*, 364.
russatus, *Lamprococcyx*, 364, 347, 348, 360, 362.
 —, — *russatus*, 368.
 —, *Neochalcites*, 364.
rutilus, *Chætura*, 266.
 —, *Chæturellus*, 267.
rutula, *Hirundo*, 267.
Ryania cyanocephala, 325.
 — *melanocephala*, 307, 318, 345, 359.
sabini, *Alterapus*, 264.
 —, *Chætura*, 264.
sacer, *Halcyon*, 180.
 —, *Sauropatis*, 158.
 —, *Todiramphus*, 142.
sacra, *Alcedo*, 142, 182.
 Sacred Kingfisher, 180.
sagittata, *Chthonicola*, 318, 336, 345, 359.
 —, *Mimeta*, 307, 374.
Salangana esculenta, 260.
 — *francica*, 248.
salussi, *Dacelo*, 132.
salvadoriana, *Tanysiptera*, 203.
 —, — *sylvia*, 203.
salvadorii, *Ægotheles*, 51, 64.
 —, *Caprimulgus*, 238, 240.
 —, — *macrurus*, 242, 244.
 —, *Rossornis macrurus*, 240, 243.
samarensis, *Ceyx*, 96.
sancta, *Dacelo*, 181.
 —, *Halcyon*, 164.
 —, *Sauropatis*, 180, 144, 146, 179, 181, 196.
 —, — *sancta*, 181, 190.
 — *Todiramphus*, 143, 181.
sanctus, *Alcyon*, 181.
 —, *Halcyon*, 144, 146, 180, 182, 183, 185, 189, 190, 191, 194, 195.
 —, — *sanctus*, 181, 189.
 —, *Sauropatis*, 156, 158.

INDEX.

- sanfordi*, *Diomedea*, 428, 429.
sanguinolenta, *Myzomela*, 345.
saturatus, *Cuculus*, 287, 290.
Sauromarptis, 106, 144.
—— *gaudichaudi*, 116.
Sauropatis, 144, 146, 147, 148, 156, 157, 160, 162, 179.
—— *chloris*, 144, 146, 195.
—— *pyrrhopygia*, 144, 173.
—— *sacer*, 158.
—— *sancta*, 180, 144, 146, 179, 181, 196.
—— — *canacorum*, 192.
—— — *confusa*, 181, 191.
—— — *fosteri*, 191.
—— — *ramsayi*, 181, 190.
—— — *ruficollaris*, 181, 190.
—— — *sancta*, 181, 190.
—— — *vagans*, 191.
—— — *westralasiana*, 181, 190.
—— *sanctus*, 156, 158.
—— *sordida*, 193, 146.
—— — *colcloughi*, 193, 195, 196.
—— — *melvillensis*, 193.
—— — *sordida*, 193, 195, 196.
—— *vagans*, 146, 158.
saurophaga, *Halcyon*, 156.
saurophagus, *Halcyon*, 160.
Saurothera, 282.
savesi, *Ægotheles*, 68.
scalaris, *Æstrelata*, 425, 426.
schlegelii, *Caprimulgus*, 242, 245.
Scythrops, 282, 283, 369, 378, 379, 380.
—— *australasiæ*, 376.
—— *australis*, 376.
—— *novæhollandiæ*, 376, 375, 379, 381.
—— — *neglectus*, 376.
—— — *novæhollandiæ*, 376.
—— *psittaceus*, 376.
Seisura inquieta, 344.
semicæruleus, *Halcyon*, 150, 160.
senegalensis, *Alcedo*, 142, 151.
——, *Halcyon*, 147, 148, 160.
senegaloides, *Halcyon*, 149, 160.
senex, *Cypselus*, 266.
Sericornis frontalis, 317.
—— *longirostris*, 307, 318, 325.
—— *magnirostris*, 318, 325, 329, 345, 359.
setosa, *Setosura*, 325.
Setosura setosa, 325.
shortridgei, *Cosmaerops ornatus*, 209.
——, *Merops ornatus*, 209.
Shortwinged Frogmouth, 19.
simplex, *Chalcites*, 293.
Sisura inquieta, 307.
Smicrornis brevirostris, 344, 359.
smyrnensis, *Alcedo*, 152, 153, 160.
Snowy Albatross, 427.
solitaria, *Alcyone*, 82.
——, *Ceyx*, 83, 95, 99.
——, *Origma*, 318.
solitaria, *Therosa*, 96, 98.
sonora, *Meliphaga*, 300, 307.
—— *Ptilotis*, 303.
sordida, *Sauropatis*, 193, 146.
——, — *sordida*, 193, 195, 196.
——, *Todiramphus*, 143.
sordidus, *Halcyon*, 144, 193, 195, 196.
—— — *sordidus*, 193, 195.
—— *Todiramphus*, 193.
Sphecotheres flaviventris, 374.
—— *maxillaris*, 307.
Spine-tailed Swift, 269.
splendens, *Malurus*, 345.
spodiopygia, *Collocalia francica*, 252.
—— *Zoonava francica*, 253.
Spotted Nightjar, 227.
Square-tailed (Brush) Cuckoo, 321.
Stagonopleura, 433, 434.
stanleyanus, *Podargus*, 5, 28, 36.
Steatornis, 1.
steerii, *Ceycalcyon cyanopectus*, 97.
——, *Ceyx*, 97.
Steganopleura, 433.
—— *annulosa*, 433.
—— *bichenovii*, 433, 434.
—— — *annulosa*, 434.
—— — *bandi*, 434.
—— — *pallescens*, 434.
—— *modesta*, 433.
—— *ruficauda*, 433.
stictolæma, *Cyanalcyon*, 155.
Stictopeleia cuneata, 344.
Stigmatops indistincta, 345.
Stipiturus malachurus, 307, 318, 345.
Stormbird, 380.
Strepera, 400.
—— *cuneicaudata*, 126.
—— *plumbea*, 129.
Streptoprocne, 247, 263, 265, 267.
striata, *Mytisa*, 318.
Strigoid Goatsucker, 5.
strigoides, *Podargus*, 5, 2, 4, 6, 13, 15, 16, 20, 23, 24, 29, 30, 31, 35, 49.
——, *Caprimulgus*, 5, 36.
——, *Podargus strigoides*, 7, 30, 31.
subcyanocephalus, *Eudynamis orientalis*, 370.
——, *Eudynamys orientalis*, 374.
Superb Menura, 395, 398.
superba, *Menura*, 395, 410, 411.
superciliosus, *Acanthorhynchus*, 345.
——, *Campbellornis*, 307.
——, *Morganornis*, 307.
superfluous, *Dacelo leachii*, 140.
swainsonii, *Polytelis*, 432.
Swallow, Needle-tailed, 269.
——, New Holland, 276.
Swift, Needle-tailed, 262.
——, Spine-tailed, 269.
——, White-rumped, 276.
Swiftlet, Grey-rumped, 248.

THE BIRDS OF AUSTRALIA.

- Swiftlet, Uniform, 255.
swinhoi, *Merops*, 206.
sylvatica, *Acanthylis*, 265, 266.
sylvaticus, *Indicapus*, 265.
sylvia, *Dacelo*, 200.
 — *rubricata*, 312, 319.
 —, *Tanysiptera*, 109, 200, 203.
 —, — *sylvia*, 200.
 —, *Uralcyon*, 200.
 —, — *sylvia*, 200.
 — *versicolor*, 357.
Syma, 105, 108, 142, 143, 144, 153, 154, 161, 162.
 — *flavirostris*, 107, 108, 110, 112.
 — *megarhyncha*, 110, 112.
 — *torotoro*, 107, 105, 108, 109, 110, 111, 112, 114.
 — — *connectens*, 114.
 — — *flavirostris*, 107, 111, 112, 113, 114.
 — — *meeki*, 110, 111, 112, 113, 114.
 — — *ochracea*, 111.
 — — *pseustes*, 113.
 — — *tentelare*, 110, 111, 112, 113.
 — — *torotoro*, 110, 113.
 — — *wellsi*, 113.
 — *weiskei*, 110.
Symposiachrus trivirgatus, 359.
tachyptera, *Collocalia fuciphaga*, 257, 258.
Tæniopygia castanotis, 345.
Tanysiptera, 108, 143, 145, 196, 201.
 — *carolinæ*, 198.
 — *hydrocharis*, 203.
 — *nais*, 198.
 — *salvadoriana*, 203.
 — *sylvia*, 109, 200, 203.
 — — *salvadoriana*, 203.
 — — *sylvia*, 200.
tasmanica, *Ægotheles cristata*, 65.
tasmanicus, *Chrysococcyx plagosus*, 354, 359.
 —, *Heteroscenes pallidus*, 294.
 —, *Lamprococcyx plagosus*, 354.
Tasmanornis humilis, 307, 318.
Tavistocka, 434.
 — *guttata*, 434.
 — — *guttata*, 434.
 — — *philordi*, 434.
 Tawny Frogmouth, 5.
Telacanthura, 264, 266, 267.
 — *ussleri*, 264.
temminckii, *Cuculus*, 346.
temporalis, *Ægintha*, 345, 359.
tentelare, *Syma torotoro*, 110, 111, 112, 113.
tenuipennis, *Merops*, 209.
tenuirostris, *Acanthorhynchus*, 307, 345, 359.
 —, *Cuculus*, 287.
terræreginæ, *Collocalia*, 248, 251, 255.
 —, — *francica*, 248, 252, 254, 259.
 —, *Cypselus*, 248, 256.
 —, *Zoonava francica*, 253.
Therapsa, 95, 96, 98.
 — *meeki*, 96, 98.
 — *solitaria*, 96, 98.
thompsoni, *Pterodroma inexpectata*, 425.
 Three-toed Kingfisher, 122.
Thyellodroma, 422, 423.
Timixos olivaceus, 307.
Todalcyon, 158, 161.
Todirhamphus, 81, 143, 144, 145, 146, 147, 153, 156, 161, 162, 180.
 — *australasiæ*, 181.
 — *divinus*, 142.
 — *funebis*, 156.
 — *macleayi*, 143, 164.
 — *pyrrhopygia*, 143, 173.
 — *recurvirostris*, 157, 158, 192.
 — *sacer*, 142.
 — *sancta*, 143, 181.
 — *sordida*, 143.
 — *sordidus*, 193.
 — *tutus*, 157, 158.
 — *veneratus*, 157.
 — *wiglesworthi*, 157.
 — *youngi*, 157, 158.
torotoro, *Syma*, 107, 108, 109, 110, 111, 112, 114.
 —, — *torotoro*, 110, 113.
torquatus, *Halcyon*, 149, 160.
townsendi, *Collocalia francica*, 252.
tregellasi, *Dacelo gigas*, 119, 130.
tribrachys, *Alcedo*, 84, 90.
 —, *Ceyx*, 84.
tricolor, *Epthianura*, 344.
 —, *Lalage*, 307, 318, 359.
 —, *Leucocirca*, 307, 318, 325, 344, 359.
 —, *Parepthianura*, 345, 359.
 —, *Rhipidura*, 300.
tridactyla, *Alcedo*, 84.
 —, *Ceyx*, 82, 96.
trivirgatus, *Symposiachrus*, 359.
Tropidorhynchus corniculatus, 307, 374.
tuta, *Alcedo*, 157.
tutus, *Todiramphus*, 157, 158.
tymbonomus, *Cacomantis*, 321, 325.
 —, *Cuculus*, 321, 325.
undulata, *Alcedo*, 118.
unicolor, *Collocalia*, 256.
 —, — *fuciphaga*, 258.
 Uniform Swiftlet, 255.
Uralcyon, 197, 203.
 — *sylvia*, 200, 197.
 — *dydimus*, 200.
 — — *sylvia*, 200.
Urica, 207.
 — *ornata*, 209.
Urodynamis, 283.
uropygialis, *Acanthiza*, 345.
ussleri, *Chætura*, 264.
 —, *Telacanthura*, 264.

INDEX.

- utingi*, *Cyanalcyon pyrrhopygius*, 174.
 —, *Halcyon pyrrhopygius*, 173, 178.
vagans, *Sauropatis*, 146, 158.
 —, — *sancta*, 191.
validirostris, *Melithreptus*, 307.
vanikorensis, *Collocalia fuciphaga*, 257, 258, 259.
 —, *Hirundo*, 259.
 Variegated Bee-eater, 208.
variegatus, *Centropus*, 384.
 —, *Cuculus*, 293, 294, 308.
 —, *Corydonix*, 384.
 —, *Polophilus*, 384.
variolosus, *Cacomantis*, 321, 329.
 —, — *pyrrhophanus*, 326, 322.
 —, *Cuculus*, 321, 322, 323, 325, 326.
 —, — *pyrrhophanus*, 321.
venerata, *Alcedo*, 157.
veneratus, *Todiramphus*, 157.
versicolor, *Cuculus*, 356, 357.
 —, *Chrysococcyx*, 356, 357.
 —, *Sylvia*, 357.
vestita, *Collocalia*, 257.
 —, — *fuciphaga*, 257.
victoriae, *Alcyone azurea*, 85.
 —, *Eurostopodus mystacalis*, 221.
 —, *Menura*, 395, 400.
 —, — *novæhollandiæ*, 396, 407.
 —, *Podargus strigoides*, 7, 31, 34.
vidgeni, *Cacomantis pyrrhophanus*, 326.
Vidgenia, 311, 327.
 — *castaneiventris*, 328, 327.
vincendonii, *Podargus*, 7, 36.
viridirufus, *Cuculus*, 321.
viridis, *Merops*, 210.
vittata, *Amaurodryas*, 307, 318, 359.
 —, *Micropus*, 276.
vittatus, *Caprimulgus*, 53, 55.
 —, *Cypselus*, 276.
vulgaris, *Menura*, 395.
waigoui, *Cuculus*, 291.
wallaceana, *Alcyone azurea*, 94.
wallacei, *Ægotheles*, 51.
 —, *Ceyx*, 96.
watsoni, *Dacelo gigas*, 119, 130.
 Wedge-tailed Goatsucker, 5.
weiskei, *Syma*, 110.
wellsi, *Syma torotoro*, 113.
westralasiana, *Sauropatis sancta*, 181, 190.
westralasianus, *Halcyon*, 181, 189.
 —, — *sanctus*, 181, 189.
westwoodia, *Cacomantis pyrrhophanus*, 322.
 —, *Cuculus*, 322, 326.
Whiteornis goodenovii, 307, 318, 325, 344, 359.
 White-rumped Swift, 276.
 — tailed Kingfisher, 200.
 — throated Nightjar, 221.
wiglesworthi, *Todiramphus*, 157.
Wilsonavis fusca, 318, 325, 344, 359.
 — *lævigaster*, 344, 359.
winchelli, *Halcyon*, 155.
woodwardi, *Amytornis*, 325.
wyndhami, *Chrysococcyx basalis*, 339, 345.
 —, *Neochalcites basalis*, 339.
yamdenæ, *Alcyone azurea*, 94.
 Yellow-billed Kingfisher, 107.
yorki, *Caprimulgus macrurus*, 236, 238, 239,
 240, 241, 244, 245.
 —, *Collocalia francica*, 255.
 — *fuciphaga francica*, 255.
 —, *Micralcyone pusilla*, 103.
 —, *Polophilus phasianinus*, 385, 391.
 —, *Rossornis macrurus*, 242, 243.
youngi, *Todiramphus*, 157, 158.
Zanthomiza phrygia, 307.
zonaris, *Hirundo*, 260, 263.
Zoonava, 246, 259, 265, 266.
 —, *Collocalia francica*, 248, 254.
 — *francica*, 248, 246, 247, 253.
 — — *francica*, 253.
 — — *fosteri*, 253.
 — — *germaini*, 253.
 — — *inexpectata*, 253.
 — — *infuscata*, 253.
 — — *oberholseri*, 253.
 — — *spodiopygia*, 253.
 — — *terræreginæ*, 255.
 — — *townsendi*, 253.
 — *fuciphaga*, 255, 247.
Zoonavena, 265, 268.
 —, *grandidieri*, 265.
Zosterops, 137.
 —, *gouldi*, 345, 359.
 —, *lateralis*, 345, 359.

SMITHSONIAN INSTITUTION LIBRARIES



3 9088 01571 2458



